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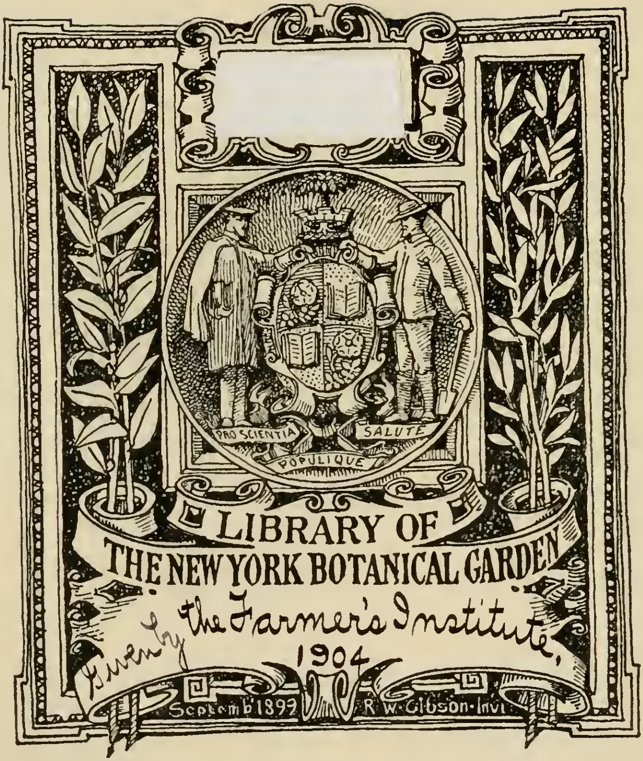
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INSTITUTE BULLETIN NO. 2. MAY, 1896.

MICHIGAN
STATE
FARMERS' INSTITUTES

WINTER OF 1895-6

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AGRICULTURAL COLLEGE, MICH.
1896

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LETTER OF TRANSMITTAL.

HON. FRANKLIN WELLS,
President State Board of Agriculture:

DEAR SIR—I herewith transmit a report of the Farmers' Institute work carried on under the direction of your honorable Board during the winter of 1895-6.

The report is intended to show the methods and results of the work under the State law of 1895. The growing importance of Institutes in this State and in other states makes it seem of interest to insert a brief history of Michigan Institutes, although the substance of such history has heretofore been printed. We have also included considerable statistical material which may not be of interest to the general reader, but which is valuable to the student of Institute work, and which will be more especially valuable for reference as the years go by. With the space at our command it has been impossible to give a lengthy report of each Institute, but we have endeavored to present something from each meeting. The bulk of the material, so far as the meetings are concerned, is edited from a stenographic report of the "Round-up" meeting at Grand Rapids. At this meeting nearly every worker employed by the Board of Agriculture presented his leading topic. Hence, the report of the Round-up contains a large proportion of the addresses made at the county meetings. A brief discussion of the chief features of the Michigan Institute system will be found in the text.

Yours respectfully,
KENYON L. BUTTERFIELD,
Superintendent.

AGRICULTURAL COLLEGE,
May 1, 1896.

Gd Rapids Eng Co

R C Kedzie

THE FARMERS' INSTITUTES OF MICHIGAN.

BY DR. R. C. KEDZIE.

For twenty successive winters the Agricultural College of Michigan has carried on a series of Farmers' Institutes. Perhaps a short historical notice of these Institutes, which have spread into most of the states of the Union, and even into foreign lands, may be of public interest.

In some European countries university professors were sent to lecture to the farmers on the sciences relating to agriculture, but the farmers took no part except as listeners. In a few states in our country the agricultural college invited the farmers to come to the college to listen to lectures on scientific subjects; but "the mountain did not come to Mahomet" to any large extent. A system of Farmers' Institutes which *went to the farmer, securing from him an equal share in the papers and discussions,* so that the farmer could say "OUR INSTITUTE," and not *"your meeting,"* where the science of the college could strike hands with experience on the farm—*such a system of Farmers' Institutes, permanently maintained, was started by the Michigan Agricultural College.**

The question how to bring the College and the farmers into more intimate relations, was a subject of earnest and frequent discussion by the members of the College Faculty twenty-five years ago. The generous offer of John A. Kerr, State Printer and Publisher of the *Lansing Republican,* to print and publish an agricultural paper if the professors would edit the paper and furnish a large part of the reading matter, was declined with regret, because the burden seemed too great for us to carry. "To write articles for the papers" seemed to measure the amount of work we could safely undertake outside of college duties.

The expediency of holding meetings in different parts of the State to consider matters of interest to agriculture, and to invite the coöperation of the farmers, was discussed for two or three years by the Faculty, but it seemed a hazardous undertaking and failure would be disheartening, and nothing was done till May 7, 1875, when the following resolutions were presented to R. C. Kedzie and unanimously adopted by the Faculty.

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* The Illinois Industrial University held Farmers' Institutes in 1869, and for several years thereafter, but so far as can be learned did not develop them into a permanent system.

Resolved, That a committee of three be appointed by the President to draw up a scheme for a series of Farmers' Institutes to be held in different parts of the State during the next winter; including in the exercises of such Institutes, lectures and essays by members of the Faculty; that the several members of the State Board of Agriculture, and leading farmers residing in the vicinity of the place of holding such Institutes, be respectfully and earnestly requested to participate in the exercises by lectures, essays and discussions.

Resolved, That said committee be instructed to confer with the State Board of Agriculture, at its next meeting, to make all necessary arrangements for inaugurating and carrying out such series of Farmers' Institutes.

President Abbot appointed as such committee, R. C. Kedzie, W. J. Beal and R. C. Carpenter. This committee drew up a memorial to the State Board, which was presented at their meeting June 1, 1875, and which is printed in full in the Report for 1875, on pp. 73 and 74. A few quotations will show the drift of the memorial:

"Whatever may be the cause, we think the *fact* is sufficiently evident that there is a want of sympathy between the farmers and the Agricultural College. * * * We believe that this want of sympathy and lack of interest are because the farmers, as a class, know but little of the real working of the College, and that if the Board and Faculty could be brought into more intimate association with farmers in all parts of the State, these evils might be removed. If the College is not doing such work as ought to command the confidence of intelligent farmers in all parts of our State, then our system should be altered so as to meet the just demands of the farmers; if we are doing such work, we may still fail of our duty, if we fail to make this fact known. * * * The farmers of our State have therefore a right to demand for themselves and for their calling all that is most helpful and stimulating to aid this great industry; and the Agricultural College, and all connected with it, will fail of their duty if they are not foremost in every movement which shall tend to the improvement of agriculture."

This new departure was anxiously considered and carefully discussed by the Board, because some of the members feared it might end in failure. "What would you call a success in this new effort?" I was asked. "If fifty leading farmers will attend the Institute, take part in its exercises and feel that they have received benefit from it, I would call the Institute a success." "Then I go in for the Farmers' Institutes, and I want the first one held in Armada, and I'll see it is a success," said Geo. W. Phillips, a member of the Board.

With some misgivings the State Board adopted the plan and appointed Messrs. Childs, Dyckman and Gard a committee to arrange for six Farmers' Institutes to be held in January, 1876, and to assign the members of the faculty to take part in them. At the suggestion of the Board an article was prepared for publication in the public prints, setting forth a general plan for the Institutes, and the objects sought to be secured by them, which was published in the *Lansing Republican*, Sept. 21, 1875, in the *Michigan Farmer* and other leading papers of the State. A few extracts are here given:

WHO WILL TAKE PART IN THE MEETINGS?

"It is expected and earnestly desired that leading farmers in the vicinity of the Institute will give lectures, read essays and take part in the discussions. It is expected that the discussions will be of special interest, in which farmers will give their views and relate their experience upon the topics proposed for discussion. * * * The members of the Board will also take part in the proceedings, and members of the College Faculty will take part if so desired.

WHO ARE INVITED?

"Every one who tills the soil or is interested in agriculture. Farmers and their wives and families are especially invited; also all who honor or would benefit the noblest of all industries.

OBJECTS.

"1. It is not the design to secure mere rhetorical efforts, but to meet and talk over, in a common sense way, matters of vital interest to the farmer.

"2. One object to be secured is to bring the farmers, the Board and the Faculty of the Agricultural College in closer relation to each other in hope of mutual benefit.

"3. One very important object to be secured is to gather up and preserve in permanent form the results of agricultural experience and views of leading farmers in different parts of the State.

"4. Finally, to give a broader scope to the instruction at the Agricultural College, and to make it more fully than ever before the exponent of the most progressive and advanced agriculture of our State.

"Farmers of Michigan! Will you 'meet the Board half way' in this effort for mutual benefit?"

The faculty realized the nature of the burden placed on their shoulders, and they went forward to this new work hopeful, yet anxious. President Abbot's strongest expression was "I *hope* they will succeed." When I look back twenty years upon this time of doubt and uncertainty and recall the grand success of these first Institutes, the words of the Psalmist come to my mind, "He that goeth forth weeping, bearing precious seed, shall doubtless come again rejoicing, bringing his sheaves with him."

The Institutes were a complete success. The meetings were crowded. the farmers full of interest, and the cordial invitation "Come again," showed that the College had done well in this new departure. Two Institutes were held on the same date, Jan. 11 and 12, 1896, one at Armada and the other at Allegan. Mr. Phillips kept his word and made his Institute a success in the largest sense. At Allegan the Institute, under the charge of Gen. Pritchard as president, and E. C. Reid as secretary, could not fail to be a success. The next Institute at Decatur with A. B. Copley to direct affairs and Capt. Hendryx to push it along, succeeded to our hearts' content. At the same date, Jan. 13 and 14, a successful Institute was carried on in Rochester. The Adrian Institute, Jan. 18, had the efficient services of Thomas F. Moore as chairman, and was a good meeting.

The Institute Jan. 20, at Coldwater, was presided over by Hon. Cyrus G. Luce, who threw himself heart and soul into the work and has been a staunch champion of the College and the Farmers' Institutes from that day onward.

Such was the beginning of a great work for Michigan, and its benefits have spread to other states.

FARMERS' INSTITUTES HELD IN MICHIGAN

TO JUNE 30, 1895, WITH DATES, PLACES, AND COUNTIES.

NOTE.—These dates are correct so far as can be discovered. In some cases the printed records are incomplete. We shall be obliged for the correction of any errors.

Date.	Place.	County.
1876.		
Jan. 11-12	Armada	Macomb.
13-14	Rochester	Oakland.
11-12	Allegan	Allegan.
13-14	Decatur	Van Buren.
18-19	Adrian	Lenawee.
20-21	Coldwater	Branch.
1877.		
Jan. 16-17	Greenville	Montcalm.
17-18	Traverse City	G'd Traverse.
23-24	Ypsilanti	Washtenaw.
25-26	Hillsdale	Hillsdale.
29-30	Owosso	Shiawassee.
31-Feb. 1	Lansing	Ingham.
1878.		
Jan. 14-15	Marshall	Calhoun.
17-18	Paw Paw	Van Buren.
21-22	Tecumseh	Lenawee.
24-25	St. Johns	Clinton.
28-29	Saginaw	Saginaw.
31-Feb. 1	Climax	Kalamazoo.
1879.		
Jan. 13-14	Charlotte	Eaton.
16-17	Flint	Genesee.
20-21	Howell	Livingston.
23-24	Centreville	St. Joseph.
28-29	Dowagiac	Cass.
Feb. 4-5	Bay City	Bay.
1880.		
Jan. 13-14	Rockford	Kent.
15-16	Big Rapids	Mecosta.
19-20	Manchester	Washtenaw.
22-23	Romeo	Macomb.
26-27	Buchanan	Berrien.
28-29	Mason	Ingham.
1881.		
Jan. 11-12	Ionia	Ionia.
13-14	Bangor	Van Buren.
18-19	Hudson	Lenawee.
20-21	Battle Creek	Calhoun.
Feb. 1-2	Oxford	Oakland.
3-4	Vassar	Tuscola.
1882.		
Jan. 17-18	Cassopolis	Cass.
19-20	Leslie	Ingham.
24-25	Berlin	Ottawa.
26-27	Greenville	Montcalm.
30-31	Lapeer	Lapeer.
Feb. 2-3	Macon	Lenawee.
1883.		
Jan. 9-10	Hastings	Barry.
16-17	Armada	Macomb.
18-19	Farmington	Oakland.
23-24	Jeddo	St. Clair.
25-26	Trent	Muskegon.
Feb. 7-8	Galesburg	Kalamazoo.
1884.		
Jan. 15-16	Berrien Centre	Berrien.
17-18	Otsego	Allegan.
22-23	Chelsea	Washtenaw.
24-25	Eaton Rapids	Eaton.
28-29	Grand Rapids	Kent.
30-31	Caro	Tuscola.
1885.		
Jan. 12-13	Plymouth	Wayne.
15-16	Flushing	Genesee.
19-20	Albion	Calhoun.
20-21	Paw Paw	Van Buren.
21-22	Manchester	Washtenaw.
22-23	Monroe	Monroe.
1886.		
Feb. 2-3	Hudsonville	Ottawa.
4-5	Rochester	Oakland.
9-10	St. Louis	Gratiot.
11-12	East Saginaw	Saginaw.
15-16	Grass Lake	Jackson.
17-18	Quincy	Branch.
1887.		
Jan. 31-Feb. 1	Grayling	Crawford.
Feb. 3-4	Fremont	Newaygo.
7-8	Hanover	Jackson.
10-11	Three Oaks	Berrien.
14-15	Bancroft	Shiawassee.
16-17	Charlotte	Eaton.
1888.		
Jan. 24-26	South Haven	Van Buren.
26-27	Grand Rapids	Kent.
31-Feb. 1	Owosso	Shiawassee.
Feb. 2-3	Ithaca	Gratiot.
8-9	Harrisville	Alcona.
13-14	Cassopolis	Cass.
14-16	Adrian	Lenawee.
16-17	Tecumseh	Lenawee.
1889.		
Jan. 29-31	Flint	Genesee.
31-Feb. 1	Grayling	Crawford.
Feb. 7-8	Big Rapids	Mecosta.
11-12	Lake Odessa	Ionia.
14-15	Brooklyn	Jackson.
18-19	Centreville	St. Joseph.
20-21	Albion	Calhoun.

FARMERS' INSTITUTES.—CONCLUDED.

Date.	Place.	County.	Place.	Place.	County.
1890.			1893.		
Feb. 3-4	Lowell	Kent.	Jan. 10-11	Hart	Oceana.
4-5	Herrington	Ottawa.	11-12	Fremont	Newaygo.
5-6	Whitehall	Muskegon.	12-13	Scottville	Mason.
6-7	Shelby	Oceana.	10-11	Tawas City	Iosco.
10-11	Mt. Pleasant	Isabella.	11-12	Gladwin	Gladwin.
11-12	Evart	Osceola.	13-14	Midland	Midland.
13-14	Cadillac	Wexford.	16-19	Paw Paw	Van Buren.
17-18	Pontiac	Oakland.	23-26	St. Louis	Gratiot.
18-19	Imlay City	Lapeer.	30-Feb. 2	Union City	Branch.
19-20	Cass City	Tuscola.	Feb. 6-9	Lowell	Kent.
20-21	Bad Axe	Huron.	13-14	Cass City	Tuscola.
1891.			14-15	Bad Axe	Huron.
Jan. 26-27	Union City	Branch.	15-16	Carsonville	Sanilac.
27-28	Concord	Jackson.	16-17	Memphis	Macomb.
28-29	Napoleon	Jackson.	1894.		
29-30	Adrian	Lenawee.	Dec. 12-13 '93	Shelby	Oceana.
Feb. 9-10	Eaton Rapids	Eaton.	13-14 '93	Hersey	Osceola.
10-11	Hastings	Barry.	18-19 '93	Allegan	Allegan.
11-12	Alpine	Kent.	21-22 '93	Alto	Kent.
12-13	Cedar Springs	Kent.	Jan. 9-12	Greenville	Montcalm.
1892.			16-19	Grand Ledge	Eaton.
Jan. 4-8	Buchanan	Berrien.	23-26	Battle Creek	Calhoun.
11-14	Rochester	Oakland.	30-Feb. 2	Coldwater	Branch.
18-19	Wayland	Allegan.	Jan. 3-4	Stockbridge	Ingham.
19-20	Howard City	Montcalm.	4-5	Highland	Oakland.
20-21	Reed City	Osceola.	8-9	Yale	St. Clair.
21-22	Harbor Springs.	Emmet.	10-11	Standish	Arenac.
25-26	Nashville	Barry.	15-16	Niles	Berrien.
26-27	St. Johns	Clinton.	17-18	Cassopolis	Cass.
27-28	Ionia	Ionia.	18-19	South Butler	Hillsdale.
28-29	Grattan	Kent.	1895.		
18-19	Clio	Genesee.	Jan. 8-11	Bancroft	Shiawassee.
19-20	Mayville	Tuscola.	8-11	Monroe	Monroe.
20-21	Abbottsford	St. Clair.	15-18	Grass Lake	Jackson.
21-22	Lapeer	Lapeer.	16-18	Washington	Macomb.
Feb. 1-2	Sherwood	Branch.	21-24	Mt. Pleasant	Isabella.
2-3	Corey	Cass.	23-25	Vermontville	Eaton.
3-4	Sturgis	St. Joseph.	29-Feb. 1	Centreville	St. Joseph.
4-5	Mendon	St. Joseph.	29-Feb. 1	Ravenna	Muskegon.
8-9	Church's Corn's	Hillsdale.	Feb. 5-8	Manistee	Manistee.
9-10	Litchfield	Hillsdale.	13-14	St. Johns	Clinton.
10-11	Belleville	Wayne.	14-15	Stephenson	Menominee.
11-12	Bell Branch	Wayne.			
1893.					
Dec. 20-21 '92	Benzonia	Benzie.			
21-22 '92	Traverse City	G'd Traverse.			
22-23 '92	Charlevoix	Charlevoix.			

APPROPRIATIONS FOR FARMERS' INSTITUTES BY THE LEGISLATURE OF MICHIGAN.

1877	$500	1887	$600
1879	600	1889	800
1881	600	1891	1,500
1883	600	1893	4,000
1885	600	1895	10,000
Total			$19,800

LAW AND RULES GOVERNING MICHIGAN FARMERS' INSTITUTES.

THE LAW GOVERNING FARMERS' INSTITUTES.

[Act No. 163 of the Public Acts of 1895.]

AN ACT to authorize the State Board of Agriculture to hold Institutes and to establish courses of reading and lectures for the instruction of citizens of this State in the various branches of agriculture, and making an appropriation therefor.

Section 1. *The People of the State of Michigan Enact,* That the State Board of Agriculture is hereby authorized to hold Institutes and to maintain courses of reading and lectures for the instruction of citizens of this State in the various branches of agriculture and kindred sciences. The said Board shall formulate such rules and regulations as it shall deem proper to carry on the work contemplated in this act, and may employ an agent or agents to perform such duties in connection therewith as it shall deem best.

Sec. 2. When twenty or more persons, residents of any county in this State, organize themselves into a society to be called the .... County Farmers' Institute Society, for the purpose of teaching better methods of farming, stock raising, fruit culture, and all the branches of business connected with the industry of agriculture, and adopt a constitution and by-laws agreeable to rules and regulations furnished by the State Board of Agriculture; and when such society shall have elected such proper officers and performed such other acts as may be required by the rules of said Board, such society shall be deemed an Institute society in the meaning of this act: *Provided,* That not more than one such Institute society in any county shall be authorized by this act: *And provided further,* That any existing organization, approved by the Board of Agriculture, shall be considered a legally organized Institute society under the terms of this act.

Sec. 3. In each county where an Institute Society shall be organized under the provisions of this act the State Board of Agriculture shall hold one annual Institute, two days in length, at such place in the county and at such time as said Board may deem expedient, and shall furnish at least two speakers or lecturers, with all expenses paid, to be present at all sessions of the Institute. The County Institute Society shall provide a suitable hall for the Institute, furnish fuel and lights, and pay other local expenses, and shall provide speakers who shall occupy one-half the time of the Institute that is given to set addresses: *Provided,* That upon the request of any local Institute Society who desire to conduct their own Institute, the State Board of Agriculture may, in their discretion, appropriate from the Institute fund money not to exceed twenty-five dollars in lieu of the speakers provided for by this act, said money to be expended by said local Institute Society entirely in Institute work.

Sec. 4. If the funds appropriated by this act will permit, the said Board of Agriculture may hold a number of four day Institutes, at such places and times as said Board may determine, at which the primary object shall be to furnish a school of instruction in practical agriculture and kindred sciences.

Sec. 5. The State Board of Agriculture shall maintain the course of reading known as the Farm Home Reading Circle, and may expend from the moneys appropriated by this act a sum not to exceed two hundred dollars for each of the two years for which the appropriation is made, for the maintenance and extension of said course.

Sec. 6. For the purposes mentioned in the preceding sections the said Board of Agriculture may use such sum as it shall deem proper, not exceeding the sum of five thousand dollars in the year ending June thirtieth, eighteen hundred ninety-six, and five thousand dollars in the year ending June thirtieth, eighteen hundred ninety-seven, and such amounts are hereby appropriated from the general funds of this State, which said sum of five thousand dollars shall, for each of the years eighteen hundred ninety-five and eighteen hundred ninety-six, be included in the State taxes apportioned by the Auditor General on all the taxable property of the State, to be levied, assessed and collected as are other State taxes, and when so assessed and collected to be paid into the general fund to reimburse said fund for the appropriations made by this act.

This act is ordered to take immediate effect.

Approved May 18, 1895.

*RULES OF THE BOARD OF AGRICULTURE GOVERNING THE MANAGEMENT OF FARMERS' INSTITUTES; UNDER ACT NO. 166 OF THE SESSION OF 1895, APPROVED BY THE GOVERNOR MAY 18, 1895.

1. The immediate management of Farmers' Institutes is placed in charge of the Superintendent of Institutes, under the direction and control of the Board of Agriculture. The Superintendent shall arrange for locating and holding Institutes under the act making appropriation therefor. He shall approve of Institute Societies authorized by law, when properly organized. After consultation with the officers of the county Institute Societies, he shall determine the time and place of holding each Institute and the subjects to be discussed, having reference in these to the branches of agriculture most prominent in the locality and the wishes of the society. He shall designate the persons to attend the Institutes as lecturers, and shall make such other arrangements as in his judgment may be necessary for the proper conduct of Institutes. He shall have authority to meet with the county Institute Societies to make arrangements for Institutes. He shall have authority to reject from the program local speakers or topics.

2. The Superintendent may call upon the faculty and instructors of the College and members of the Experiment Station force for such an amount of Institute work as may be assigned them by the Board. He may, with the approval of the Board, employ such other lecturers as may be needed for the conduct of Institutes. He shall arrange for such reports of proceedings of the Institutes as the Board shall direct. He may appoint from the faculty or others employed by the Board "Institute conductors," who may be designated to preside at Institutes and who shall have general charge of the program at the Institutes assigned to them. They may be required to report as to the conduct and result of the Institutes under their charge.

*RULES FOR THE ORGANIZATION OF COUNTY FARMERS' INSTITUTE SOCIETIES AND THE CONDUCT OF INSTITUTES.

1. Counties desiring an Institute must first organize under the provisions of the law. To organize, at least twenty residents of the county, without regard to sex but of legal age, shall meet and adopt a brief constitution, forms for which are hereafter given, and by-laws, in harmony with the State law and the rules of the Board, and shall proceed to elect the following officers: A president, a vice president from each township in the county, and a secretary who shall also be treasurer. The president and secretary, together with three vice presidents designated by the society, shall constitute an executive committee, who may be authorized by the society to transact the routine business of the society in connection with holding Institutes. Hereafter the annual election of officers shall be held during the annual Institute meeting, only members of the society being entitled to vote.

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* These rules are as revised by the Board of Agriculture in April, 1896.

Each Institute Society shall immediately report its organization to the Superintendent of Institutes, accompanied by the name of the society, the name and postoffice address of each officer, and a copy of the constitution and by-laws. In case more than one such society shall be organized in a county the one first reporting shall be recognized as the Institute Society for that county, if it shall have been properly organized.

Provided, That any existing Institute Society in a county may be accepted as the legal Institute Society for that county. Such society shall furnish to the Secretary of the State Board of Agriculture a copy of its constitution and by-laws, and transmit with the same a written agreement, signed by the president and secretary of such society, stating that the society will conform to the general rules of the Board of Agriculture governing Farmers' Institutes. Such society will, at the next annual Institute held under the auspices of the Board of Agriculture, be expected to adopt the constitution prescribed by the Board, and to elect officers in accordance therewith.

Provided also, That in any county where there exists an active county agricultural society which is fairly representative of the whole county, such society may, for purposes of holding Farmers' Institutes, be accepted as the legal Institute Society for that county. Such society shall furnish to the Secretary of the Board of Agriculture a copy of its constitution and by-laws, and shall transmit with the same a written agreement, signed by the president and secretary of the society, stating that the society will, for the purposes of Farmers' Institutes, conform to the rules of the Board of Agriculture governing such Institutes.

2. The secretary of each Institute Society shall keep in a substantial book a record of all meetings of the executive committee and of the society, and a roll of the members, with the postoffice address of each.

3. When societies are notified of the date assigned for their Institute the executive committee shall proceed at once to complete the arrangements for their Institute by engaging a hall, selecting the local speakers desired, arranging for music, etc. The Superintendent shall send to the secretary of the Institute, at least six weeks before the date of the Institute, a list of speakers to be furnished by the Board, with the topics they are to discuss, and the time most convenient for the presentation of the same. The secretary shall complete the program by adding the local assignments, and shall have it printed immediately and shall see that copies are freely distributed among the farmers of the county. Should anything occur to make it necessary to change the date of or to abandon the meeting of the Institute, notice shall at once be sent to the Superintendent.

4. All Institute Societies organized or acting under the law shall be strictly nonpartisan and non-sectarian in every phase of their work, and no Institute shall be operated in the interest of any party, grange, alliance, farmers' club, sect or society, but for the equal good of all citizens and farming communities.

5. No subject shall be presented at the regular sessions of the Institute, nor any discussion allowed, of a partisan or sectarian nature, nor shall any speaker be allowed, in his lecture or speech or in any discussion, to advertise wares or schemes in which he has a pecuniary interest. But exhibits of farm and garden products, and implements, devices, or materials used in rural life, shall be encouraged, and if possible a separate room shall be provided for such exhibit.

6. No fee shall be charged for admission to the annual Institute, nor contributions asked for, but all expenses shall be previously provided for. If the society desires to hold other meetings during the year the expenses of such meetings may be met as the society sees fit.

7. An Institute Society may adopt such by-laws, in its discretion, as it may desire, provided that they are not in conflict with the rules of the Board of Agriculture.

8. An Institute Society desiring to conduct its own Institute without the aid of speakers furnished by the Board may apply to the Board for funds, not to exceed twenty-five dollars, for their use for such purpose. Said society shall give a satisfactory guarantee that such funds will be properly expended, and shall transmit, within ten days after the Institute has closed, an itemized statement of the expenditures from said fund. No county taking advantage of this rule shall be furnished with any other aid, during the year, than from this fund.

9. Within ten days after the close of each Institute the secretary shall make a report to the Superintendent, blanks for which will be furnished by the Superintendent.

CONSTITUTION ADOPTED BY FARMERS' INSTITUTE SOCIETIES.

Article I. This organization shall be known as the ---------------------- County Farmers' Institute Society.

Art. II. The object of this society shall be the holding of at least one Farmers' Institute in this county each year, devoted to the dissemination among the people of information which shall aid in teaching better methods of farming, stock-raising, fruit culture, and all the branches of business connected with the industry of agriculture, and thus making the cultivation of the soil more profitable and rural life more attractive.

Art. III. Any resident of the county of legal age may become a member of this society by signing the constitution and paying a fee of ---- cents, which shall be used for incidental expenses. This fee shall be the annual fee.* Only members of the society shall vote at the election of officers.

Art. IV. The officers of this society shall consist of a president, a vice president from each township in the county, and a secretary who may also be treasurer. The secretary shall keep, in a suitable book, a record of the transactions of the organization and a complete list of its members and their postoffice addresses. He shall also furnish to the Board of Agriculture such reports of the Institute as the Board may direct. The details of the business of the society shall be in the hands of an executive committee, consisting of the president, secretary, and three vice presidents designated by the society.

Art. V. The annual meeting of this society shall be held at the time of the annual State Institute, and the election of officers shall take place at this time.

Art. VI. This society shall meet the local expenses of State Institutes by membership dues or by voluntary contributions secured before the period of holding such Institutes.

Art. VII. This society shall endeavor to promote at the Institutes artistic and educational displays of rural products and devices to lighten labor; to avoid all discussions of a partisan or sectarian nature; not to allow any person in the lectures and discussions to advertise wares or schemes in which he has a direct or indirect pecuniary interest; and to secure publicity to the proceedings.

Art. VIII. This society shall be governed by, and shall at all times be subject to, the laws of the State and the rules of the State Board of Agriculture governing Farmers' Institutes.

AGREEMENT ENTERED INTO BY INSTITUTE SOCIETIES EXISTING AT TIME OF PASSAGE OF LAW OF 1895.

The --------------------------- Society of ----------------------- County, by its president and secretary, agrees to conform to the general rules of the State Board of Agriculture governing Farmers' Institutes, and promises that, if it desires to continue as the Institute Society of said county, it will, at the first Institute held under the auspices of said Board, adopt the constitution prescribed by the Board and elect officers in accordance therewith.

A copy of the constitution and by-laws of this society is forwarded herewith.

---*President.*
---*Secretary.*

AGREEMENT ENTERED INTO BY COUNTY AGRICULTURAL SOCIETIES.

The -- County Agricultural Society, by its president and secretary, hereby agrees to conform to the rules of the State Board of Agriculture governing Farmers' Institutes, in so far as this society may desire to use its organization for the purpose of conducting Farmers' Institutes in this county under Act No. 166 of the Public Acts of 1895.

A copy of the constitution and by-laws of this society is transmitted herewith.

---*President.*
---*Secretary.*

It is understood that a county agricultural society accepted as a county Institute Society will not be required to change its constitution and by-laws. It must conform to all other rules of the Board.

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* The amount of the fee can be determined and inserted by each society, as it deems best.

COUNTY FARMERS' INSTITUTE SOCIETIES

WITH OFFICERS FOR 1895-6.*

County.	President.	Address.	Secretary.	Address.
Alcona	Jos. Van Buskirk	Harrisville	Geo. E. Gillam	Harrisville.
Alger[1]				
Allegan	F. W. Robinson	Fennville	C. E. Bassett	Fennville.
Alpena[3]	E. O. Avery	Alpena	E. H. Toland	Ossineke.
Antrim	Clark E. Mills	Mancelona	T. H. Glover	Mancelona.
Arenac[3]	John Donohue	Sterling	A. Forsyth	Standish.
Baraga[1]				
Barry	Andrew Kennedy	Hastings	R. M. Bates	Hastings.
Bay	Frank Marston	Bay City	C. B. Chatfield	Bay City.
Benzie	Perry G. Holden	Benzonia	R. B. Reynolds	Frankfort.
Berrien[2]	Osmond C. Howe	Buchanan	Erastus Murphy	Berrien Centre.
Branch	L. M. Marsh	Gilead	A. J. Aldrich	Coldwater.
Calhoun[2]	Wm. S. Simons	Battle Creek	C. C. McDermid	Battle Creek.
Cass[2]	T. T. Higgins	Cassopolis	W. W. Reynolds	Cassopolis.
Charlevoix[4]	John Nicholls	Charlevoix	E. B. Ward	Charlevoix.
Cheboygan	Geo. E. Frost	Cheboygan	P. L. Lapres	Cheboygan.
Chippewa	H. A. Osborn	Sault Ste. Marie	T. R. Easterday	Sault Ste. Marie.
Clare[1]				
Clinton[2]	Decatur Bross	St. Johns	J. T. Daniells	Union Home.
Crawford[2]	W. C. Johnson	Pere Cheney	Henry Funck	Pere Cheney.
Delta[1]				
Dickinson	John Perkins	Norway	L. F. Springer	Norway.
Eaton[3]	J. H. Gallery	Eaton Rapids	Geo. A. Perry	Charlotte.
Emmet[2]	John Swift	Harbor Springs	Byron Bartlett	Harbor Springs.
Genesee	Geo. W. Stuart	Grand Blanc	E. H. Stone	Grand Blanc.
Gladwin	Eugene Foster	Gladwin	F. C. Smith	Gladwin.
Gogebic[1]				
Grand Traverse[1]				
Gratiot[2]	I. N. Cowdrey	Ithaca	C. A. Van Deventer	Ithaca.
Hillsdale	N. I. Moore	Moscow	Earl H. Dresser	Jonesville.
Houghton[1]				
Huron[2]	D. Buchanan	North Burns	Mrs. Geo. Pangman	Verona Mills.
Ingham	Jno. W. Gifford	Williamston	L. H. Ives	Mason.
Ionia	Luther E. Hall	Ionia	C. I. Goodwin	Ionia.
Iosco	John Preston	Tawas City	A. H. Phinney	Tawas City.
Iron	Adolph Forsberg	Iron River	P. O'Brien	Iron River.
Isabella	Wallace W. Preston	Mt. Pleasant	Michael E. Kane	Mt. Pleasant.
Jackson	E. T. Bornor	Parma	J. W. Hutchins	Hanover.
Kalamazoo[2]	Wm. Strong	Kalamazoo	Addison M. Brown	Schoolcraft.
Kalkaska	A. E. Palmer	Kalkaska	D. P. Rosenberg	Kalkaska.
Kent	C. W. Garfield	Grand Rapids	C. A. French	Grand Rapids.
Keweenaw[1]				
Lake	Ernest Nichoson	Luther	A. A. Miner	Luther.
Lapeer	Henry Lee	Lapeer	G. W. Carpenter	Lapeer.
Leelanau[1]				
Lenawee[3]	Geo. B. Horton	Fruit Ridge	H. H. Ferguson	Adrian.
Livingston[2]	B. F. Batcheler	Oceola Centre	Dwight M. Beckwith	Howell.
Luce[1]				
Mackinac[1]				
Macomb	Jas. B. Eldridge	Mt. Clemens	Watson W. Lyons	Mt. Clemens.

COUNTY FARMERS' INSTITUTE SOCIETIES WITH OFFICERS FOR 1895-6.—CONCLUDED.

County.	President.	Address.	Secretary.	Address.
Manistee	Geo. W. Hopkins	Bear Lake	John N. Brodie	Bear Lake.
Marquette	Thos. Smith	Harvey	F. H. Vandenboom	Marquette.
Mason[3]	A. E. Smith	Ludington	W. J. Meisenheimer	Ludington.
Mecosta	W. E. Taylor	Big Rapids	V. W. Bruce	Big Rapids.
Menominee[2]	Edward Sawbridge	Stephenson	Norwood Bowers	Stephenson.
Midland[2]	Jas. G. Culver	Midland	Frank H. Olmsted	Midland.
Missaukee	Harvey Bartholomew	Pioneer	Jas. E. Wright	Lake City.
Monroe[2]	J. H. Pickard	West Toledo, Ohio	J. W. Morris	Monroe.
Montcalm	Oscar Fenn	Stanton	Edwin Porter	Stanton.
Montmorency[1]				
Muskegon	George Bolt	Casnovia	Chas. E. Whitney	Muskegon.
Newaygo[2]	Augustine White	Brookside	George E. Hilton	Fremont.
Oakland	Peter Voorheis, Jr.	Pontiac	C. S. Bartlett	Pontiac.
Oceana[3]	Fred J. Russell	Hart	Jno. P. Butler	Hart.
Ogemaw	John Klacking	Campbell's Corners	H. S. Karcher	Rose City.
Ontonagon	Jas. E. Crooker	Ontonagon	Geo. W. Schoch	Ontonagon.
Osceola	Oscar M. Brownson	Evart	Chas. A. Waffle	Evart.
Oscoda	John J. McCarthy	Mio	John Randall	Mio.
Otsego	Jos. Glasson, Sr.	Gaylord	Wm. M. Smith	Gaylord.
Ottawa[1]				
Presque Isle[1]				
Roscommon	Jas. H. Sly	Roscommon	A. C. Sly	Roscommon.
Saginaw	W. B. Cubbage	Freeland	Fred C. Zimmerman	Saginaw, E. S.
Sanilac	Richard Pearson	Urban	E. M. Denton	Sanilac Centre.
Schoolcraft[1]				
Shiawassee[2]	Amos Parmenter	Vernon	Duane C. Cooper	Corunna.
St. Clair	Chas. S. King	Port Huron	L. B. Rice	Port Huron.
St. Joseph[2]	Alexander Sharp	Centreville	B. F. Wilcox	Centreville.
Tuscola	L. E. Belknap	Mayville	Fred H. Orr	Caro.
Van Buren[1]				
Washtenaw	J. A. McDougall	Ypsilanti	H. Stumpenhusen	Rawsonville.
Wayne	S. A. Cady	Wayne	J. H. Hanford	Plymouth.
Wexford	John Mansfield	Cadillac	Samuel J. Wall	Cadillac.

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* For dates of organization of county institute societies see list of officers of societies for 1896-7.

[1] These counties failed to organize under the law and rules of 1895.

[2] Existing institute societies which held an institute under the law, by agreeing to observe the rules of the State Board of Agriculture governing farmers' institutes. Most of these afterward organized under the law at the time of their institute. See Rule 1 of "Rules for the organization of county farmers' institute societies."

[3] County agricultural societies acting as county institute societies, and agreeing to Board rules governing farmers' institutes. See same rule as above.

[4] Charlevoix county failed to organize within the limit prescribed by the rules, but formed an organization and applied for a State institute.

FARMERS' INSTITUTES HELD IN 1895-6

WITH DATES AND ATTENDANCE.

The attendance is figured in the following manner: The Secretary of the Institute and the Conductor sent by the Board each reported the attendance by sessions. The estimate is based on the largest number present at any one time of the session. We have averaged the reports of the Secretary and the Conductor separately, and averaged the results. The reports show considerable discrepancies in many cases and indicate some careless counting. But by the method used we have probably attained a generally fair estimate of the average attendance at each institute. The attendance includes woman's sections.

County.	Place.	Dates.	Reported by	Attendance.							
				1st session.	2d session.	3d session.	4th session.	5th session.	6th session.	Average of each.	Gen'l average per session.
Alcona	Harrisville	Jan. 8-9, 1896	Conductor.	46	73	90	112	147	248	119	----
			Secretary	30	75	100	40	100	200	91	105
Allegan	Fennville	Jan. 15-16, 1896	Conductor.	250	316	235	264	485	263	302	302
			Secretary	Inc	om	ple	te.				
Alpena	Alpena	Jan. 7-8, 1896	Conductor.	55	75	75	50	70	----	65	----
			Secretary	44	58	68	83	64	---	63	64
Antrim	Mancelona	Jan. 16-17, 1896	Conductor.	65	110	250	200	240	350	202	
			Secretary	140	200	500	160	200	600	300	251
Arenac	Standish	Nov. 20-21, 1895	Conductor.	6	30	30	12	28	75	30	----
			Secretary	20	25	25	20	20	45	26	28
Barry	Hastings	Jan. 21-22, 1896	Conductor.	150	300	250	350	600	300	325	----
			Secretary	350	350	250	250	450	250	317	321
Bay	Bay City	Jan. 13-14, 1896	Conductor.	Not	rep	ort	ed.				
			Secretary	50	100	60	50	100	75	72	72
Benzie	Frankfort	Jan. 7-8, 1896	Conductor.	Not	rep	ort	ed.				
			Secretary	65	115	475	200	225	225	217	217
Berrien	St. Joseph	Jan. 16-17, 1896	Conductor.	150	500	300	475	755	300	413	----
			Secretary	75	200	300	250	680	350	309	361
Branch	Coldwater	Jan. 28-29, 1896	Conductor.	250	302	900	272	659	729	519	----
			Secretary	275	550	1100	425	725	950	671	595
Calhoun	Battle Creek	Jan. 23-24, 1896	Conductor.	150	226	242	301	864	613	399	----
			Secretary	125	225	325	325	850	500	391	395
Cass	Cassopolis	Jan. 24-25, 1896	Conductor.	56	163	220	222	550	250	243	---
			Secretary	56	160	220	220	550	250	243	243

INSTITUTES, 1895-6.—Continued.

County.	Place.	Dates.	Reported by	Attendance.							
				1st session.	2d session.	3d session.	4th session.	5th session.	6th session.	Average of each.	Gen'l average per session.
Charlevoix	Charlevoix	Jan. 15-16, 1896	Conductor.	75	120	200	100	150	400	174	----
			Secretary	----	----	----	Ave	rag	e.	225	199
Cheboygan	Cheboygan	Nov. 12-13, 1896	Conductor.	23	36	41	25	82	50	34	34
			Secretary	Inc	om	ple	te.				
Chippewa	Sault Ste. Marie	Jan. 10-11, 1896	Conductor.	50	75	60	60	80	65	65	----
			Secretary	65	80	40	80	100	55	70	67
Clinton	St. Johns	Jan. 21-22, 1896	Conductor.	150	250	225	150	200	100	179	----
			Secretary	150	250	250	150	300	150	208	193
Crawford	Grayling	Nov. 14-15, 1895	Conductor.	22	50	55	24	44	125	53	53
			Secretary	Inc	om	ple	te.				
Dickinson	Norway	Oct. 30-31, 1895	Conductor.	20	25	30	15	25	40	26	26
			Secretary	Not	rep	ort	ed.				
Eaton	Charlotte	Feb. 19-20, 1896	Conductor.	93	189	107	237	402	250	213	----
			Secretary	92	150	150	200	300	250	190	201
Emmet	Harbor Springs	Jan. 13-14, 1896	Conductor.	50	100	150	150	200	250	150	----
			Secretary	200	250	250	300	350	400	291	220
Genesee	Grand Blanc	Jan. 27-28, 1896	Conductor.	400	500	700	400	600	700	550	550
			Secretary	Not	rep	ort	ed.				
Gladwin	Gladwin	Nov. 21-22, 1895	Conductor.	24	35	175	38	48	200	87	----
			Secretary	30	50	200	75	80	250	114	100
Gratiot	Alma	Jan. 29-30, 1896	Conductor.	300	350	500	350	800	500	466	----
			Secretary	350	500	450	350	550	500	450	458
Hillsdale	Jonesville	Jan. 29-30, 1896	Conductor.	175	350	250	350	550	250	321	----
			Secretary	300	450	300	400	600	450	416	368
Huron	Bad Axe	Jan. 21-22, 1896	Conductor.	155	150	225	205	325	350	235	----
			Secretary	55	150	223	205	325	350	218	226
Ingham	Dansville	Jan. 30-31, 1896	Conductor.	115	260	325	225	410	275	268	----
			Secretary	150	200	225	200	500	225	250	259
Ionia	Ionia	Jan. 22-23, 1896	Conductor.	300	525	425	350	410	390	400	----
			Secretary	475	600	600	350	450	350	471	435
Iosco	Tawas City	Jan. 9-10, 1896	Conductor.	43	58	64	49	68	114	66	66
			Secretary	Not	rep	ort	ed.				
Iron	Iron River	Oct. 31, Nov. 1-2 '95	Conductor.	100	30	50	150	28	45	67	----
			Secretary	150	40	30	200	30	65	86	76
Isabella	Mt. Pleasant	Jan. 30-31, 1896	Conductor.	300	350	400	250	300	500	350	350
			Secretary	Not	rep	ort	ed.				
Jackson	Parma	Jan. 21-22, 1896	Conductor.	225	290	354	240	310	422	307	----
			Secretary	250	350	350	300	350	400	333	320
Kalamazoo	Cooper	Jan. 22-23, 1896	Conductor.	300	375	350	325	515	300	361	----
			Secretary	200	250	250	275	440	300	286	323
Kalkaska	Kalkaska	Nov. 14-15, 1895	Conductor.	80	200	250	80	100	250	160	----
			Secretary	80	170	250	165	225	300	198	179
Kent	Grand Rapids Round up	Feb. 11-14, 1896	Conductor.	200	500	800	225	475	875	----	----
				7th	8th	9th	10th				
				300	475	950	225	----	----	503	503
			Secretary	Inc	om	ple	te.				
Lake	Luther	Nov. 19-20, 1895	Conductor.	50	120	300	60	100	300	155	----
			Secretary	150	200	400	200	200	450	266	210

INSTITUTES, 1895-6.—CONTINUED.

County.	Place.	Dates.	Reported by	Attendance.							
				1st session.	2d session.	3d session.	4th session.	5th session.	6th session.	Average of each.	Gen'l average per session.
Lapeer	Lapeer	Jan. 24-25, 1896	Conductor.	Not	rep	o r t	ed.				
			Secretary	200	250	150	225	300	150	212	212
Lenawee	Adrian	Jan. 22-23, 1896	Conductor.	200	380	200	200	380	300	277	277
			Secretary	Inc	o m	p l e	te.				
Livingston	Howell	Jan. 30-31, 1896	Conductor.	74	325	270	262	336	210	246	----
			Secretary	150	250	150	250	350	140	215	230
Macomb	Mt. Clemens	Jan. 24-25, 1896	Conductor.	77	119	111	139	74	----	104	104
			Secretary	Not	rep	o r t	ed.				
Manistee	Bear Lake	Jan. 9-10, 1896	Conductor.	100	200	280	250	350	400	263	----
			Secretary	250	300	350	300	350	400	325	294
Marquette	Marquette	Jan. 8-9, 1896	Conductor.	65	200	600	75	450	650	840	----
			Secretary	65	140	600	75	450	1000	388	364
Mason	Ludington	Jan. 7-8, 1896	Conductor.	50	65	46	60	65	----	57	----
			Secretary	90	100	35	80	80	----	77	67
Mecosta	Big Rapids	Nov. 21-22, 1895	Conductor.	75	280	169	119	168	163	162	162
			Secretary	Not	rep	o r t	ed.				
Menominee	Stephenson	Oct. 28-29, 1895	Conductor.	75	100	250	60	100	300	147	----
			Secretary	150	250	225	225	800	250	233	190
Midland	Midland	Jan. 14-15, 1896	Conductor.	87	109	151	98	239	267	158	----
			Secretary	23	45	70	40	80	160	60	113
Missaukee	Lake City	Nov. 18-19, 1895	Conductor.	20	100	160	30	30	50	65	----
			Secretary	12	100	300	20	30	50	85	75
Monroe	Petersburgh	Jan. 23-24, 1896	Conductor.	85	200	300	225	350	320	247	----
			Secretary	75	200	300	250	350	300	246	246
Montcalm	Stanton	Jan. 23-24, 1896	Conductor.	62	115	150	120	175	175	133	----
			Secretary	100	200	200	250	250	200	200	166
Muskegon	Muskegon	Jan. 14-15, 1896	Conductor.	88	130	95	130	400	111	159	----
			Secretary	98	128	92	170	407	170	177	168
Newaygo	Fremont	Jan. 9-10, 1896	Conductor	28	100	310	175	175	100	148	----
			Secretary	100	250	400	350	250	400	292	220
Oakland	Pontiac	Jan. 27-28, 1896	Conductor.	85	190	325	180	300	250	222	222
			Secretary	Inc	o m	p l e	te.				
Oceana	Hart	Jan. 13-14, 1896	Conductor.	150	300	200	225	650	400	321	321
			Secretary	Not	rep	o r t	ed.				
Ogemaw	Rose City	Jan. 10-11, 1896	Conductor.	70	100	200	125	200	247	157	----
			Secretary	100	125	200	300	200	250	196	176
Ontonagon	Ontonagon	Nov. 4-5, 1895	Conductor.	20	80	100	30	100	----	56	----
			Secretary	19	31	150	23	250	----	95	75
Osceola	Evart	Nov. 20-21, 1895	Conductor.	45	160	160	80	120	150	119	----
			Secretary	25	165	125	35	100	125	96	107
Oscoda	Mio	Nov. 18-19, 1895	Conductor	31	46	93	41	69	115	66	68
			Secretary	Not	rep	o r t	ed.				
Otsego	Gaylord	Nov. 13-14, 1895	Conductor.	29	42	96	26	49	265	84	84
			Secretary	Not	rep	o r t	ed.				
Roscommon	Roscommon	Nov. 15-16, 1895	Conductor.	22	38	141	32	58	396	114	----
			Secretary	30	75	150	50	100	250	109	111

INSTITUTES, 1895-6.—CONCLUDED.

County.	Place.	Dates.	Reported by	Attendance.							
				1st session.	2d session.	3d session.	4th session.	5th session.	6th session.	Average of each.	Gen'l average per session.
Saginaw	Saginaw	Jan. 15-16, 1896	Conductor.	52	84	55	60	85	80	69	69
			Secretary	Not	rep	o r t	ed.				
Sanilac	Sanilac Centre	Jan. 22-23, 1896	Conductor.	95	145	300	160	200	300	200	200
			Secretary	Not	rep	o r t	ed.				
Shiawassee	Corunna	Jan. 28-29, 1896	Conductor.	75	100	200	150	300	400	204	204
			Secretary	Not	rep	o r t	ed.				
St. Clair	Port Huron	Jan. 23-24, 1896	Conductor.	150	300	350	200	400	500	317	----
			Secretary	200	400	600	400	600	700	483	400
St. Joseph	Centreville	Jan. 27-28, 1896	Conductor.	100	275	300	250	550	300	296	----
			Secretary	50	100	200	100	475	250	196	246
Tuscola	Caro	Jan. 16-17, 1896	Conductor.	267	389	350	340	644	587	429	429
			Secretary	Not	rep	o r t	ed.				
Van Buren	South Haven Long institute	Feb. 3-7, 1896	Conductor.	Not	rep	o r t	ed.				
				150	300	350	300	400	450	----	----
				7th	8th	9th	10th	11th	12th		
			Secretary	500	400	450	525	450	450	393	393
Washtenaw	Ypsilanti	Jan. 29-30, 1896	Conductor.	93	200	350	200	300	400	257	----
			Secretary	176	350	500	300	550	400	379	318
Wayne	Wayne	Jan. 28-29, 1896	Conductor.	150	300	420	350	350	420	331	----
			Secretary	250	400	700	500	600	750	533	432
Wexford	Cadillac	Nov. 15-16, 1895	Conductor.	52	128	118	48	64	51	77	----
			Secretary	50	125	125	75	50	100	87	82

LECTURERS AT FARMERS' INSTITUTES 1895-6.

There were three classes of lecturers. I. Men already in the employment of the State Board of Agriculture, who performed Institute work for expenses only. II. Parties employed by the Board for Institute work solely. They were paid expenses and a per diem varying from two to three dollars per day. III. Persons in State employ whose services at Institutes were secured without expense to the Institute fund.

The figures after each name indicate the approximate number of weeks of Institute service during the season.

I.

Prof. W. B. Barrows, Professor Entomology and Zoology, Agricultural College	4
Dr. W. J. Beal, Professor Botany and Forestry, Agricultural College	4
Hon. W. E. Boyden, Member State Board of Agriculture, Delhi Mills	2
Hon. I. H. Butterfield, Secretary State Board of Agriculture, Agricultural College	3
A. A. Crozier, Assistant in Agriculture, Experiment Station, Agricultural College	4
G. C. Davis, Consulting Entomologist, Experiment Station, Agricultural College	4
Dr. H. Edwards, Professor English Literature and Modern Languages, Agricultural College	6
Hon. C. W. Garfield, Member State Board of Agriculture, Grand Rapids	3
H. P. Gladden, Assistant in Horticulture, Experiment Station, Agricultural College	4
Thomas Gunson, Florist, Agricultural College	2
Prof. W. O. Hedrick, Assistant Professor History and Political Economy, Agricultural College	4
Prof. W. S. Holdsworth, Assistant Professor of Drawing, Agricultural College	2
Prof. F. S. Kedzie, Adjunct Professor of Chemistry, Agricultural College	4½
Dr. R. C. Kedzie, Professor of Chemistry, Agricultural College	2½
Lieut. E. A. Lewis, Professor of Military Science and Tactics, Agricultural College	3
H. W. Mumford, Assistant in Agriculture, Agricultural College	4
Prof. A. B. Noble, Assistant Professor English Literature and Modern Languages, Agricultural College	2
Prof. C. D. Smith, Professor of Agriculture and Director of Experiment Station, Agricultural College	4½
Prof. L. R. Taft, Professor of Horticulture, Agricultural College	4
G. H. True, Instructor in Dairying, Agricultural College	6
Prof. H. K. Vedder, Professor of Mathematics and Civil Engineering, Agricultural College	½
Prof. P. B. Woodworth, Assistant Professor of Physics, Agricultural College	4
Total weeks	77

II.

Hon. Wm. Ball, Hamburgh	5
J. H. Brown, Climax	4
I. N. Cowdrey, Ithaca	2
Robert Gibbons, Detroit	1
Hon. A. C. Glidden, Paw Paw	3
Hon. R. D. Graham, Grand Rapids	2
Prof. A. G. Gulley, Storrs, Ct.	2
A. W. Haydon, Decatur	2
R. M. Kellogg, Ionia	4
Hon. C. G. Luce, Coldwater	6½
Mrs. Mary A. Mayo, Battle Creek	7
Roland Morrill, Benton Harbor	3
Hon. F. W. Redfern, Maple Rapids	4
Miss Margaret M. Sill, Detroit	2
A. H. Smith, Paw Paw*	
J. N. Stearns, Kalamazoo	3½
Hon. R. L. Taylor, Lapeer	2
H. E. Van Norman, Agricultural College	6
Total weeks	59

III.

John I. Breck, Inspector State Dairy and Food Commission, Jackson	4
R. L. Hewitt, Statistician Secretary of State, Lansing	2
W. L. Rossman, State Analyst, Lansing	2
Lieut. C. F. Schneider, Director Weather Bureau, Lansing	2
Total weeks	10

Total number of weeks' work	146
By College and Station workers	77
By others	69

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SCHEDULE OF SPEAKERS AND TOPICS AT INSTITUTES OF 1895-6.

The following schedules were made out primarily for the benefit of the Superintendent and the lecturers. They are published partly to show our methods to those interested in the details of Institute work, and partly to indicate the programs of each Institute so far as Board speakers are concerned.

Each topic is numbered, and in the schedule the number refers to the number of the topic on which the speaker was assigned to speak at that hour. Each lecturer was provided with a schedule of his trip, together with the names of hotels at which he could secure reduced rates. He thus knew just when he should be at each appointment, his topic, and where to go on his arrival.

The printed programs slightly varied from these schedules in a few cases, secretaries being given some discretion as to the precise hour that the lecture should occur. In but very few cases did our lecturers fail to appear at the appointed time.

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* Mr. Smith was engaged for two weeks' work, but was taken sick and was unable to go out.

MENOMINEE TRIP.

Counties of Menominee, Dickinson, Iron and Ontonagon.

WORKERS AND TOPICS.

Hon. Chas. W. Garfield—No. 1.—Apple and Plum Growing.
No. 2.—Small Fruits.
No. 3.—The Farmer and the Farm.
Hon. I. H. Butterfield—No. 1.—The Value of Improved Live Stock.
No. 2.—Ensilage and Silos.
No. 3.—Clovers and Grasses—Their Value in Farming.
G. C. Davis—No. 1.—Insects Injurious to Fruit.
No. 2.—Insect Pests of the Field and Garden.
G. H. True—No. 1.—The Breeding and Feeding of Dairy Cattle.
No. 2.—Making Good Butter. Illustrated with dairy apparatus.
K. L. Butterfield—Agricultural Education.

Stephenson, Oct. 28-29.	Norway, Oct. 30-31.	Iron River, Oct. 31, Nov. 1-2.	Ontonagon, Nov. 4-5.
		Thursday, Oct. 31.	
		Garfield—No. 3, 8 p. m.	
Monday, Oct. 28.	Wednesday, Oct. 30.	Friday, Nov. 1.	Monday, Nov. 4.
Davis—No. 1, 10:10 a. m. Davis—No. 2, 10:40 a. m.	Davis—No. 1, 10:10 a. m. Davis—No. 2, 10:40 a. m.	Davis—No. 1, 10 a. m. Davis—No. 2, 10:30 a. m.	Davis—No. 1, 10:10 a. m. Davis—No. 2, 10:40 a. m.
Garfield—No. 1, 2 p. m. Garfield—No. 2, 2:50 p. m.	Garfield—No. 1, 2 p. m. Garfield—No. 2, 2:50 p. m.	Garfield—No. 1, 2 p. m. Garfield—No. 2, 2:50 p. m.	I. H. Butterfield—No. 3, 2 p. m. True—No. 2, 2:30 p. m.
K. L. Butterfield—7 p. m. Stereopticon.	K. L. Butterfield, 7 p. m. Garfield—No. 3, 8 p. m.	K. L. Butterfield, 7 p. m. Stereopticon.	Stereopticon—7 p. m.
Tuesday, Oct. 29.	Thursday, Oct. 31.	Saturday, Nov. 2.	Tuesday, Nov. 5.
I. H. Butterfield—No. 1, 10 a. m. True—No. 1, 10:50 a. m.	I. H. Butterfield—No. 1, 10 a. m. True—No. 1, 10:50 a. m.	I. H. Butterfield—No. 1. 10 a. m. True—No. 1, 10:50 a. m.	I. H. Butterfield, No. 1, 10 a. m. True—No. 1, 10:50 a. m.
I. H. Butterfield—No. 2, 2 p. m. True—No. 2, 2:25 p. m.	I. H. Butterfield—No. 3, 2 p. m. True—No. 2, 2:30 p. m.	I. H. Butterfield—No. 3, 1:40 p. m. True—No. 2, 2:10 p. m.	Garfield—No. 1, 2 p. m. Garfield—No. 2, 2:50 p. m.
Garfield—No. 3, 8 p. m.	Stereopticon—7 p. m.		Garfield—No. 3, 8 p. m.
Conductor, Garfield.	Conductor, I. H. Butterfield.	Conductor, Garfield.	Conductor, I. H. Butterfield.

CHEBOYGAN TRIP.

Counties of Cheboygan, Otsego, Crawford, Roscommon, Oscoda, Arenac and Gladwin.

WORKERS AND TOPICS.

Prof. F. S. Kedzie—No. 1.—Are Drouths More Frequent?
  No. 2.—Manuring on Light Lands.
  No. 3.—Frosts.
H. P. Gladden—No. 1.—Planting and Care of Orchards.
  No. 2.—Potatoes.
  No. 3.—Small Fruits.
G. C. Davis—No. 1.—Insects injurious to Fruit.
  No. 2.—Insect Pests of the Field and Garden.
Hon. Wm. Ball—No. 1.—The Value of Improved Live Stock.
  No. 2.—Bean Culture.
  No. 3.—Farm Management.
H. E. Van Norman—Making Good Butter. Illustrated with dairy apparatus.
A. A. Crozier—No. 1.—Management of Soils During a Drouth.
  No. 2.—Grasses and Clovers for Northern Michigan.
  No. 3.—The Effect of the Removal of Timber.

First week.

Cheboygan, Nov. 12-13.	Gaylord, Nov. 13-14.	Grayling, Nov. 14-15.	Roscommon, Nov. 15-16.
Tuesday, Nov. 12.	Wednesday, Nov. 13.	Thursday, Nov. 14.	Friday, Nov. 15.
Gladden—No. 1, 10:10 a. m. Gladden—No. 2, 11 a. m.	Crozier—No. 1, 10:10 a. m. Crozier—No. 2, 10:55 a. m.	Ball—No. 1, 10:10 a. m. Crozier—No. 3, 10:50 a. m. Crozier—No. 1, 11:30 a. m.	Kedzie—No. 3, 10:10 a. m. Van Norman—11 a. m.
Ball—No. 1, 1:45 p. m. Ball—No. 2, 2:40 p. m. Van Norman—3 p. m.	Ball—No. 1, 1:45 p. m. Ball—No. 2, 2:40 p. m. Van Norman—3 p. m.	Kedzie—No. 1, 1:45 p. m. Kedzie—No. 2, 2:25 p. m. Van Norman—3:10 p. m.	Gladden—No. 1, 2:10 p. m. Glsdden—No. 3, 2:40 p. m. Ball—No. 1, 3:10 p. m.
Ball—No. 3, 8 p. m.	Ball—No. 3, 8 p. m.	Kedzie—No. 3, 7:40 p. m. Ball—No. 3, 8 p. m.	Ball—No. 3, 7:40 p. m.
Wednesday, Nov. 13.	Thursday, No. 14.	Friday, Nov. 15.	Saturday, Nov. 16.
Kedzie—No. 1, 10 a. m. Kedzie—No. 2, 10:50 a. m.	Gladden—No. 1, 10 a. m. Gladden—No. 2, 10:50 a. m.	Crozier—No. 2, 10:25 a. m.	Kedzie—No. 1, 10 a. m. Kedzie—No. 2, 10:50 a. m.
Davis—No. 1, 1:45 p. m. Davis—No. 2, 2:20 p. m. Kedzie—No. 3, 3:20 p. m.	Davis—No. 1, 1:45 p. m. Davis—No. 2, 2:15 p. m.	Davis—No. 1, 1:45 p. m. Davis—No. 2, 2:20 p. m.	Davis—No. 1, 2 p. m. Davis—No. 2, 2:35 p. m.
Stereopticon—7 p. m.	Stereopticon—7 p. m.	Gladden—No. 1, 8 p. m.	Stereopticon—7 p. m.
Conductor, Kedzie.	Conductor, Gladden.	Conductor, Crozier.	Conductor, Kedzie.

Cheboygan trip—Second week.

Mio, Nov. 18-19.	Standish, Nov. 20-21.	Gladwin, Nov. 21-22.
Monday, Nov. 18.	Wednesday, Nov. 20.	Thursday, Nov. 21.
Crozier—No. 1, 10:10 a. m. Crozier—No. 2, 10:55 a. m.	Kedzie—No. 1, 10:10 a. m. Crozier—No. 1, 10:25 a. m. Kedzie—No. 2, 11 a. m. Kedzie—No. 3. 11:40 a. m.	Kedzie—No. 3, 9:40 a. m. Kedzie—No. 2, 10:25 a. m.
Ball—No. 1, 1:45 p. m. Ball—No. 2, 2:40 p. m. Van Norman—3 p. m. Crozier—No. 3, 4 p. m.	Ball—No. 1, 1:45 p. m. Ball—No. 2, 2:40 p. m. Van Norman—3 p. m.	Van Norman—2 p. m.
Ball—No. 3, 8 p. m.	Ball—No. 3, 8 p. m.	Ball—No. 3, 8 p. m.
Tuesday, Nov. 19.	Thursday, Nov. 21.	Friday, Nov. 22.
Gladden—No. 1, 10 a. m. Gladden—No. 10:50 a. m.	Gladden—No. 1, 10 a. m. Gladden—No. 2, 10:50 a. m.	Gladden—No. 1, 10 a. m. Gladden—No. 2, 10:50 a. m.
Davis—No. 1, 1:45 p. m. Davis—No. 2, 2:15 p. m.	Davis—No. 1, 1:30 p. m. Davis—No. 2, 2:05 p. m. Crozier—No. 2, 3:10 p. m.	Ball—No. 2, 2:10 p. m. Ball—No. 1, 3 p. m.
Stereopticon—7 p. m.	Stereopticon—7 p. m.	Kedzie—No. 1, 7 p. m. Crozier—No. 1, 7:15 p. m. Crozier—No. 2, 8 p. m.
Conductor, Gladden.	Conductor, Crozier.	Conductor, Kedzie.

KALKASKA TRIP.

Counties of Kalkaska, Wexford, Missaukee, Lake, Osceola and Mecosta.

WORKERS AND TOPICS.

Dr. H. Edwards—Agricultural Education.
Prof. W. O. Hedrick—Taxation.
G. H. True—No. 1.—Making Good Butter. Illustrated with dairy apparatus.
No. 2.—Breeding and Feeding Dairy Cattle.
Hon. C. G. Luce—No. 1.—How to Fertilize.
No. 2.—The Farmer's Contribution to Society.
R. M. Kellogg—No. 1.—The Farmer's Fruit Garden.
No. 2.—Tillage for Drouthy Seasons.
I. N. Cowdrey—No. 1.—Potato Growing.
No 2.—Clover on the Farm.
Mrs. Mary A. Mayo—No. 1.—Making Housework Easier. } Woman's section.
No. 2.—Mother and Daughter. }
John I. Breck—What We Eat.

First week.

Kalkaska, Nov. 14-15.		Cadillac, Nov. 15-16.	
Thursday, Nov. 14.	Friday, Nov. 15.	Friday, Nov. 15.	Saturday Nov. 16.
Cowdrey—No. 1, 10 a. m. Cowdrey—No. 2, 11 a. m.	Kellogg—No. 1, 9:45 a. m. Kellogg—No. 2, 11:05 a.m.	Cowdrey—No. 1, 10 a. m. Cowdrey—No. 2, 11 a. m.	Kellogg—No. 1, 10 a. m. True—No. 2, 10:40 a. m.
Luce—No. 1, 2:30 p. m. Mrs. Mayo—2 p. m.	True—No. 1, 1:15 p. m. True—No. 2, 3.10 p. m.	Luce—No. 1, 2:30 p. m. Mrs. Mayo—2 p. m.	Kellogg—No.2, 1:45 p. m. True—No. 1; 2:25 p. m.
Breck—7:45 p. m. Luce—No. 2, 8:15 p. m.	Hedrick—7:15 p m. Edwards—8:15 p. m.	Breck—7:15 p. m. Luce—No. 2, 8:15 p. m.	Hedrick, 7:15 p. m. Edwards—8:15 p. m.
Conductor, True.		Conductor, Luce.	

Kalkaska trip—Second week.

Lake City, Nov. 18-19.	Luther, Nov. 19-20.	Evart, Nov. 20-21.	Big Rapids, Nov. 21-22.
Monday, Nov. 18.	Tuesday, Nov. 19.	Wednesday, Nov. 20.	Thursday, Nov. 21.
Cowdrey—No. 1. 10:30 a. m.	True—No. 2, 10:40 a. m.	Cowdrey—No. 1, 10 a. m. Cowdrey—No. 2, 11 a. m.	Cowdrey—No. 1, 10 a. m. Cowdrey—No. 2, 11 a. m.
Cowdrey—No. 2, 1:45 p. m. Luce No. 1, 2:35 p. m. Mrs. Mayo—2 p. m.	Cowdrey—No. 1, 2 p. m. Cowdrey—No. 2, 2:50 p. m. Mrs. Mayo—2 p. m.	Luce—No. 1, 2:30 p. m. Mrs. Mayo—2 p. m.	Luce—No. 1, 2:30 p. m. Mrs. Mayo—2 p. m.
Breck—7:45 p. m. Luce—No. 2, 8:15 p. m.	Breck—7:45 p. m. Luce—No. 2, 8:15 p. m.	Breck—7:45 p. m. Luce—No. 2, 8:15 p. m.	Breck—7:45 p. m. Luce—No. 2, 8:15 p. m.
Tuesday, Nov. 19.	Wednesday, Nov. 20.	Thursday, Nov. 21.	Friday, Nov. 22.
Kellogg—No. 1, 9:45 a. m. Kellogg—No. 2, 11:05 a. m.	True—No 1, 10:30 a. m.	Kellogg—No. 1, 10 a. m. True—No. 2, 10:40 a. m.	Kellogg—No. 1, 10 a. m. True—No. 2, 10:40 a. m.
Hedrick—2:40 p. m.	Kellogg—No. 1, 2 p. m. Kellogg—No. 2, 2:50 p. m.	Kellogg—No. 2, 1:45 p. m. True—No. 1, 2:25 p. m.	Kellogg—No. 2, 1:45 p. m. True—No. 1, 2:25 p. m.
Edwards—8:15 p. m.	Hedrick, 7:15 p. m. Edwards—8:15 p. m.	Hedrick—7:15 p. m. Edwards—8:15 p. m.	Hedrick—7:15 p. m. Edwards—8:15 p. m.
Conductor, K. L. Butterfield.	Conductor, True.	Conductor, K. L. Butterfield.	Conductor, Luce.

MARQUETTE TRIP.

Counties of Marquette, Chippewa, Emmet, Charlevoix and Antrim.

WORKERS AND TOPICS.

J. H. Brown—No. 1.—The Farm Dairy.
No. 2.—The Rotation of Crops.
No. 3.—The Dairy Herd.
A. A. Crozier—No. 1.—Grasses and Clovers for Northern Michigan.
No. 2.—The Effect of the Removal of Timber.
No. 3.—Small Fruits.
H. W. Mumford—No. 1.—The Principles of Stock Breeding.
No. 2.—Breeds of Sheep and How to Feed Them.
Prof. A. G. Gulley—No. 1.—Spraying the Orchard Fruits.
No. 2.—Propagation for the Ordinary Horticulturist.
No. 3.—Small Fruits.
Conductor—Agricultural Education.

Marquette, Jan. 8-9.	Sault Ste. Marie, Jan. 10-11.	Harbor Springs, Jan. 13-14.	Charlevoix, Jan. 15-16.	Mancelona, Jan. 16-17.
Wednesday, Jan. 8.	Friday, Jan. 10.	Monday, Jan. 13.	Wednesday, Jan. 15.	Thursday, Jan. 16.
Crozier—No. 1, 10:30 a. m.	Crozier—No. 1, 10:30 a. m.	Brown—No. 1, 10:30 a. m.	Crozier—No. 1, 10:30 a. m.	Mumford—No. 1, 10:30 a. m.
Mumford—No. 1, 2 p. m. Brown—No. 3, 3 p. m.	Brown—No. 1, 2 p. m. Brown—No. 3, 3 p. m.	Gulley—No. 1, 2 p. m. Brown—No. 3, 3 p. m.	Mumford—No. 1, 2 p. m. Brown—No. 1, 3 p. m.	Brown—No. 1, 2 p. m. Brown—No. 3, 3 p. m.
Brown—No. 2, 7:30 p. m.	Crozier—No. 2, 7:30 p. m.	Brown—No. 2, 7:30 p. m.	Brown—No. 2, 7:30 p. m. Brown—No. 3, 8:30 p. m.	Mumford—No. 2, 7:30 p. m.
Thursday, Jan. 9.	Saturday, Jan. 11.	Tuesday, Jan. 14.	Thursday, Jan. 16.	Friday, Jan. 17.
Crozier—No. 2, 10:30 a. m. Crozier—No. 3, 11:30 a. m.	Mumford—No. 1, 10:30 a. m.	Gulley—No. 2, 10:30 a. m.	Gulley—No. 1, 10:30 a. m.	Brown—No. 2, 10:30 a. m.
Brown—No. 1, 2 p. m.	Brown—No. 2, 2 p. m. Crozier—No. 3, 3 p. m.	Crozier—No. 1, 2 p. m. Gulley—No. 3, 3 p. m.	Crozier—No. 2, 2 p. m. Gulley—No. 3, 3 p. m.	Gulley—No. 2, 2 p. m. Gulley—No. 3, 3 p. m.
Mumford—No. 2, 7:30 p. m. Agl. Ed., 8:30 p. m.	Mumford—No. 2, 7:30 p. m. Agl. Ed., 8:30 p. m.	Mumford—No. 2, 7:30 p. m. Agl. Ed., 8:30 p. m.	Gulley—No. 2, 7:30 p. m. Agl. Ed., 8:30 p. m.	Crozier—No. 1, 7:30 p. m. Agl. Ed., 8:30 p. m.
Conductor, Mumford.	Conductor, Crozier.	Conductor, Gulley.	Conductor, Crozier.	Conductor, Mumford.

ALPENA TRIP.

Counties of Alpena, Alcona, Iosco, Ogemaw, Bay, Midland, Saginaw and Tuscola.

WORKERS AND TOPICS.

Dr. W. J. Beal—No. 1.—Forest Fires. Illustrated Lecture.
No. 2.—Clovers and Grasses for Northern Michigan.
Prof. P. B. Woodworth—The Boiling Point.
Lieut. E. A. Lewis—Military Training and its Relation to Citizenship.
Hon. A. C. Glidden—No. 1.—Water in the Soil.
No. 2.—The Weather Tomorrow.
Hon. W. E. Boyden—No. 1.—Breeding Improved Live Stock.
No. 2.—Will Feeding for Beef Pay in Michigan?
H. P. Gladden—No. 1.—Apples and Plums.
No. 2.—Potato Growing.
No. 3.—How and When to Spray.
H. E. Van Norman—Making Good Butter. Illustrated with dairy apparatus.
Prof. C. D. Smith—No. 1.—Breeding and Feeding Dairy Cattle.
No. 2.—Keeping up Soil Fertility.
Prof. H. K. Vedder—Obstacles to Road Improvement—Can they be Removed?
Thos. Gunson—No. 1.—A Plea for Small Farms.
No. 2.—Development of Cultivated Plants.
K. L. Butterfield—Plows and Politics.
Miss Margaret M. Sill—Demonstration Lectures in Cooking. Woman's section.

First week.

Alpena, Jan. 7-8.	Harrisville, Jan. 8-9.	Tawas City, Jan. 9-10.	Rose City, Jan. 10-11.
Tuesday, Jan. 7.	Wednesday, Jan. 8.	Thursday, Jan. 9.	Friday, Jan. 10.
Gladden—No. 1, 10 a. m. Gladden—No. 3, 11 a. m.	Gladden—No. 1, 10 a. m. Gladden—No. 3, 11 a. m.	Gladden—No. 1, 10 a. m.	Glidden—No. 1, 10 a. m.
Glidden—No. 1, 2 p. m. Van Norman—3 p. m.	Glidden—No. 1, 2 p. m. Van Norman—3 p. m.	Gladden—No. 3, 2 p. m. Van Norman—3 p. m.	Van Norman—3 p. m.
Lewis—7 p. m. Beal—No. 1, 8 p. m.	Lewis—8 p. m.	Lewis—8 p. m.	Lewis—8 p. m.
Wednesday, Jan. 8.	Thursday, Jan. 9.	Friday, Jan. 10.	Saturday, Jan. 11.
Boyden—No. 1, 10 a. m.	Woodworth—10 a. m.	Gladden—No. 2, 10 a. m.	Glidden—No. 2, 10 a. m.
Boyden—No. 2, 2 p. m.	Boyden—No. 1, 2 p. m. Beal—No. 2, 3 p. m.	Boyden—No. 1, 2 p. m. Beal—No. 2, 3 p. m.	Boyden—No. 1, 2 p. m. Beal—No. 2, 3 p. m.
Beal—No. 2, 8 p. m.	Beal—No. 1, 8 p. m.	Woodworth—7 p. m. Beal—No. 1, 8 p. m.	Woodworth—7 p. m. Beal—No. 1, 8 p. m.
Conductor, Beal.	Conductor, Woodworth.	Conductor, Gladden.	Conductor, Glidden.

Alpena trip—Second week.

Bay City, Jan. 13-14.	Midland, Jan. 14-15.	Saginaw, Jan. 15-16.	Caro, Jan. 16-17.
Monday, Jan. 13.	Tuesday, Jan. 14.	Wednesday, Jan. 15.	Thursday, Jan. 16.
Gladden—No. 2, 10 a. m. Boyden—No. 2, 11 a. m.	Boyden—No. 2, 10 a. m. Gladden—No. 3, 11 a. m.	Boyden—No. 2, 10 a. m. K. L. Butterfield, 11 a. m.	Boyden—No. 2, 10 a. m. Vedder—11 a. m.
Smith—No. 1, 2 p. m. Van Norman—3 p. m.	Smith—No. 2, 2 p. m. Van Norman—3 p. m.	Gunson—No. 1, 2 p. m. Van Norman—3 p. m.	Gladden—No. 3, 2 p. m. Van Norman—3 p. m. Miss Sill, 2 p. m.
Lewis—8 p. m.	Lewis—8 p. m.	Gunson—No. 2, 7, p. m. Lewis—8 p. m.	Lewis—8 p. m.
Tuesday, Jan. 14.	Wednesday, Jan. 15.	Thursday, Jan. 16.	Friday, Jan. 17.
K. L. Butterfield—10 a. m.	Gladden—No. 2, 10 a. m. Vedder—11 a. m.	Smith—No. 2, 10 a. m.	Gladden—No. 2, 10 a.m. Smith—No. 2, 11 a. m.
Gunson—No. 1, 2 p. m. Beal—No. 2, 3 p. m.	Beal—No. 2, 2 p. m.	Smith—No. 1, 2 p. m.	Smith—No. 1, 2 p. m. Miss Sill, 2 p. m.
Woodworth—7 p. m. Beal—No. 1, 8 p. m.	Woodworth—7 p. m. Beal—No. 1, 8 p. m.	Woodworth—7 p. m. Beal—No. 1, 8 p. m.	Woodworth—7 p. m. Beal—No. 1, 8 p. m.
Conductor, Beal.	Conductor, Gladden.	Conductor, Smith.	Conductor, Gladden.

BENZIE TRIP.

Counties of Benzie, Manistee, Mason, Newaygo, Oceana, Muskegon, Allegan and Berrien.

WORKERS AND TOPICS.

Prof. A. G. Gulley—No. 1.—Propagation for the Ordinary Horticulturist.
No. 2.—Spraying the Orchard Fruits.
Hon. Wm. Ball—No. 1.—The Value of Improved Live Stock.
No. 2.—Farm Management.
R. Morrill—No. 1.—Locating and Planting the Peach Orchard.
No. 2.—Cultivation and Care of Peaches.
No. 3.—Marketing Peaches.
No. 4.—Varieties of Peaches and Profits of Peach Growing.
Prof. W. B. Barrows—No. 1.—Birds and Horticulture.
No. 2.—Bees and Horticulture.
Dr. H. Edwards—The Morrill Idea.
Prof. C. D. Smith—No. 1.—Breeding and Feeding Live Stock.
No. 2.—Modern Methods of Butter Making.
*A. H. Smith—No. 1.—Soil Fertility Practically Considered.
No. 2.—What Makes the Successful Fruit Grower?
R. D. Graham—No. 1.—Peach Culture—Growing the Crop.
No. 2.—Peach Culture—Harvesting and Marketing.
Hon. F. W. Redfern—A Plea for Unity of Action Among Farmers.
R. M. Kellogg—Tillage for Drouthy Seasons.
Mrs. Mary A. Mayo—No. 1.—Making Housework Easier. } Woman's section.
No. 2.—Mother and Daughter.
K. L. Butterfield—Plows and Politics.
Prof. L. R. Taft—Irrigation for Michigan.

First week.

Frankfort, January 7-8.	Bear Lake, January 9-10.	Ludington, January 7-8.	Fremont, January 9-10.
Tuesday, January 7.	Thursday, January 9.	Tuesday, January 7.	Thursday, January 9.
Gulley—No. 2, 11 a. m.	Barrows—No. 1, 11 a. m.	A. H. Smith—No. 1, 11 a. m.	Graham—No. 1, 11 a. m.
Mrs. Mayo—2 p. m. Gulley—No. 1, 2 p. m. Barrows—No. 1, 3 p. m.	Gulley—No. 1, 2 p. m. Barrows—No. 2, 3 p. m.	Graham—No. 1, 2 p. m. Graham—No. 2, 3 p. m.	Mrs. Mayo—2 p. m. Graham—No. 2, 2 p. m. A. H. Smith—No. 1, 3 p. m.
K. L. Butterfield—7:30 p. m. Ball—No. 2, 8:15 p. m.	Ball—No. 2, 8:15 p. m.	A. H. Smith—No. 2, 8:15 p. m.	Woman's Evening—7:30 p. m.
Wednesday, January 8.	Friday, January 10.	Wednesday, January 8.	Friday, January 10.
Morrill—No. 1, 10 a. m.	Morrill—No. 3, 10 a. m.	C. D. Smith—No. 2, 10 a. m.	A. H. Smith—No. 2, 10 a. m.
Ball—No. 1, 2 p. m. Morrill—No. 2, 3 p. m.	Ball—No. 1, 2 p. m. Morrill—No. 4, 3 p. m.	Kellogg—2 p. m. C. D. Smith—No. 1, 3 p. m.	C. D. Smith—No. 1, 2 p. m. Kellogg—3 p. m. Mrs. Mayo—2 p. m.
Edwards—8:15 p. m.	Edwards—8:15 p. m.	Redfern—8:15 p. m.	Redfern—8:15 p. m.
Conductor, Ball.	Conductor, Gulley.	Conductor, C. D. Smith.	Conductor, Graham.

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* Mr. A. H. Smith was unable to attend these institutes on account of sickness. Mr. J. N. Stearns of Kalamazoo supplied his place at Ludington, Fremont, Fennville and St. Joseph.

Benzie trip—Second week.

Hart, January 13-14.	Muskegon, January 14-15.	Fennville, January 15-16.	St. Joseph, January 16-17.
Monday, January 13.	Tuesday, January 14.	Wednesday, January 15.	Thursday, January 16.
A. H. Smith—No. 1, 10 a. m. Morrill—No. 2, 11 a. m.	A. H. Smith—No. 1, 11 a. m.	Morrill—No. 2, 11 a. m.	Taft—11 a. m.
Barrows—No. 1, 2 p. m. Morrill—No. 3, 3 p. m.	Morrill—No. 2, 2 p. m. Morrill—No. 3, 3 p. m.	A. H. Smith—No. 1, 3 p. m.	A. H. Smith—No. 1, 3 p. m.
Redfern—8:15 p. m.	Redfern—8:15 p. m.	Redfern—8:15 p. m.	Redfern—8:15 p. m.
Tuesday, January 14.	Wednesday, January 15.	Thursday, January 16.	Friday, January 17.
Taft—10 a. m.	Barrows—No. 2, 10 a. m.	Morrill—No. 3, 10 a. m.	Barrows—No. 1, 10 a. m.
Mrs. Mayo—2 p. m. Kellogg—3 p. m.	Mrs. Mayo—2 p. m. Taft—2 p. m. Kellogg—3 p. m.	Mrs. Mayo—2 p. m. Kellogg—2 p. m. Barrows—No. 2, 3:30 p. m.	Mrs. Mayo—2 p. m. Morrill—No. 2. 2 p. m. Kellogg—3 p. m.
Edwards—8:15 p. m.	Edwards—8:15 p. m.	Edwards—8:15 p. m.	Edwards—8:15 p. m.
Conductor, Taft.	Conductor, Barrows.	Conductor, Morrill.	Conductor, Taft.

HURON TRIP.

Counties of Huron, Sanilac, St. Clair, Lapeer, Genesee, Shiawassee, Gratiot and Isabella.

WORKERS AND TOPICS.

Hon. Wm. Ball—No. 1.—Value of Improved Live Stock.
No. 2.—Farm Management.
No. 3.—Practical Methods in Stock Breeding.
No. 4.—Farm Life.
J. N. Stearns—No. 1.—Growing Small Fruits at a Profit.
No. 2.—How can Apples and Plums be Made to Pay?
Prof. P. B. Woodworth—The Boiling Point.
Dr. W. J. Beal—Our Forest Problem. Illustrated Lecture.
Hon. A. C. Glidden—Water in the Soil.
Hon. R. L. Taylor—A Talk About the Honey-bee and Bee Keeping.
R. L. Hewitt—Census and other Statistics.
W. L. Rossman—Adulteration of Food.
K. L. Butterfield—Plows and Politics.
Secretary I. H. Butterfield—The Agricultural College; Its Equipment and Work.
Lieut. C. F. Schneider—The Weather Bureau—Its Forecasts and its Weather Crop Bulletins.

First week.

Bad Axe, January 21-22.	Sanilac Centre, January 22-23.	Port Huron, January 23-24.	Lapeer, January 24-25.
Tuesday, January 21.	Wednesday, January 22.	Thursday, January 23.	Friday, January 24.
Ball—No. 1, 11 a. m.	Glidden—11 a. m.	Ball—No. 1, 11 a. m.	Ball—No. 3, 11 a. m.
Glidden—2 p. m. Ball—No. 2, 3 p. m.	Ball—No. 1, 2 p. m.	Glidden—2 p. m.	Ball—No. 2, 2 p. m.
Woodworth—7:30 p. m. Beal—8:15 p. m.	Ball—No. 2, 8:15 p. m.	Rossman—7:30 p. m. Hewitt—8:15 p. m.	Rossman—7:30 p. m. Hewitt—8:15 p. m.
Wednesday, January 22.	Thursday, January 23.	Friday, January 24.	Saturday, January 25.
Stearns—No. 1, 10 a. m.	Stearns—No. 1, 10 a. m.	Stearns—No. 1, 10 a. m. K. L. Butterfield—11 a. m.	Glidden—10 a. m.
Stearns—No. 2, 2 p. m. Taylor—3 p. m.	Stearns—No. 2, 2. p. m. Taylor—3 p. m.	Stearns—No. 2, 2 p. m. Taylor—3 p. m.	Stearns—No. 2, 2 p. m. Taylor—3 p. m.
Rossman—8:30 p. m.	Woodworth—7:30 p. m. Beal—8:15 p. m.	Woodworth—7:30 p. m. Beal—8:15 p. m.	Woodworth—7:30 p. m. Beal—8:15 p. m.
Conductor, Beal.	Conductor, Woodworth.	Conductor, Glidden.	Conductor, Ball.

Huron trip—Second week.

Grand Blanc, January 27-28.	Corunna, January 28-29.	Alma, January 29-30.	Mt. Pleasant, January 30-31.
Monday, January 27.	Tuesday, January 28.	Wednesday, January 29.	Thursday, January 30.
Glidden—10 a. m. Ball—No. 3, 11 a. m. Taylor—12 M. K. L. Butterfield—1 p. m.	Schneider—11 a. m.	Taylor—11 a. m.	Schneider—11 a. m.
	Taylor—2 p. m. Ball—No. 2, 3 p. m.	Schneider—2 p. m. Ball—No. 2, 3 p. m.	Taylor—2 p. m. Glidden—3 p. m.
Hewitt—6:30 p. m. Rossman—7:30 p. m. Ball—No. 4, 8:15 p. m.	Rossman—7:30 p. m. Hewitt—8:15 p. m.	Rossman—7:30 p. m. Hewitt—8:15 p. m.	Rossman—7:30 p. m. Hewitt—8:15 p. m.
Tuesday, January 28.	Wednesday, January 29.	Thursday, January 30.	Friday, January 31.
Stearns—No. 2, 10 a. m. I. H. Butterfield—11 a. m.	Stearns—No. 1, 10 a. m.	Stearns—No. 1, 10 a. m.	Stearns—No. 1, 10 a. m.
	Glidden—2 p. m. Stearns—No. 2, 3 p. m.	Stearns—No. 2, 2 p. m. Ball—No. 1, 3 p. m.	Stearns—No. 2, 2 p. m. Ball—No. 4, 3 p. m.
Woodworth—7:30 p. m. Beal—8:15 p. m.	Woodworth—7:30 p. m. Beal—8:15 p. m.	Woodworth—7:30 p. m. Beal—8:15 p. m.	Woodworth—7:30 p. m. Beal—8:15 p. m.
Conductor, I. H. Butterfield.	Conductor, Glidden.	Conductor, Ball.	Conductor, Glidden.

CLINTON TRIP.

Counties of Clinton, Ionia and Montcalm.

WORKERS AND TOPICS.

Dr. R. C. Kedzie—Wheats for Michigan.
Prof. W. B. Barrows—Some Insect Enemies and How to Fight Them.
Secretary I. H. Butterfield—No. 1.—The Immediate Future of the Sheep Industry.
No. 2.—The Present Standing of Ensilage as a Food for the Various Kinds of Stock.
Hon. R. D. Graham—No. 1.—Peach Growing.
No. 2.—Small Fruits for the Farmer.
Lieut. E. A. Lewis—Military Training and its Relation to Citizenship.
Lieut. C. F. Schneider—The Weather Bureau,—Its Forecasts and its Weather Crop Bulletins.
R. M. Kellogg—No. 1.—Tillage for Drouthy Seasons.
No. 2.—Small Fruit for the Farmer.
Thomas Gunson—House Plants—What to Have and How to Care for Them in Winter.
G. H. True—No. 1.—Making Good Butter. Illustrated with dairy apparatus.
No. 2.—The Dairy Herd.
K. L. Butterfield—Plows and Politics.

St. Johns, January 21-22.	Ionia. January 22-23.	Stanton, January 23-24.
Tuesday, January 21.	Wednesday, January 22.	Thursday, January 23.
Dr. Kedzie—11 a. m.	Graham—No. 1, 11 a. m.	True—No. 2, 11 a. m.
Barrows—2 p. m. True—No. 1, 3:30 p. m.	True—No. 1, 2 p. m. Barrows—3:30 p. m.	Gunson—2 p. m. Graham—No. 2, 3 p. m.
K. L. Butterfield—7:30 p. m. Lieut. Lewis—8 p. m.	K. L. Butterfield—7:30 p. m. Lieut. Lewis, 8 p. m.	Lieut. Lewis, 8 p. m.
Wednesday, January 22.	Thursday, January 23.	Friday, January 24.
Kellogg—No. 2, 10 a. m.	Kellogg—No. 1, 10 a. m.	I. H. Butterfield—No. 1, 10 a. m.
Kellogg—No. 1, 2 p. m. I. H. Butterfield—No. 1, 3 p. m.	I. H Butterfield—No. 2, 1:30 p. m. Dr. Kedzie—2:30 p. m.	Barrows, 2 p. m. I. H. Butterfield—No. 2, 3 p. m.
Schneider—8 p. m.	Schneider—8 p. m.	Schneider—8 p. m.
Conductor, I. H. Butterfield.	Conductor, Barrows.	Conductor, True.

BARRY TRIP.

Counties of Barry Kalamazoo, Calhoun, Cass, St. Joseph, Branch, Hillsdale and Ingham.

WORKERS AND TOPICS.

Dr. R. C. Kedzie—Wheats for Michigan.
Prof. F. S. Kedzie—No. 1.—Commercial Fertilizers; is Their Use Profitable for the General Farmer?
No. 2.—The Chemistry of the Kitchen.
Prof. L. R. Taft—No. 1.—How Shall we Meet the Summer Drouths?
No. 2.—Spraying for Insects and Fungi.
J. H. Brown—No. 1.—The Dairy Herd.
No. 2.—Manure Making and Saving.
H. E. Van Norman—Making Good Butter. Illustrated with dairy apparatus.
Hon. F. W. Redfern—A Plea for Unity of Action Among Farmers.
A. B. Noble—Reading in the Farm Home.
W. S. Holdsworth—Art on the Farm.
Mrs. Mary A. Mayo—No. 1.—Making Housework Easier. } Woman's section.
No. 2.—Mother and Daughter. }
K. L. Butterfield—Plows and Politics.
Prof. W. B. Barrows—No. 1.—Birds and Farmers.
No. 2.—Some Insect Enemies and How to Fight Them.

First week.

Hastings, Jan. 21-22.	Cooper, Jan. 22-23.	Battle Creek, Jan. 23-24.	Cassopolis, Jan. 24-25.
Tuesday, Jan. 21.	Wednesday, Jan. 22.	Thursday, Jan. 23.	Friday, Jan. 24.
F. S. Kedzie—No. 1, 10 a. m. Taft—No. 1. 11 a. m.	F. S. Kedzie—No. 1, 11 a. m.	F. S. Kedzie—No. 2, 11 a. m.	Brown—No. 2, 11 a. m.
Brown—No. 1, 2 p. m. Van Norman, 3:30 p. m.	Brown—No. 1, 2 p. m. Van Norman, 3:30 p. m.	Brown--No. 1, 2 p. m. Van Norman, 3:30 p. m.	Brown—No. 1, 2 p. m. Van Norman—3:30 p. m.
Noble—7:30 p. m. Holdsworth, 8 p. m.	Noble—7:30 p. m. Holdsworth—8 p. m.	Noble—7:30 p. m. Holdsworth—8 p. m.	Noble—7:30 p. m. Holdsworth—8 p. m.
Wednesday, Jan. 22.	Thursday, Jan. 23.	Friday, Jan. 24.	Saturday, Jan. 25.
	Taft—No. 1, 10 a. m.	Dr. Kedzie—10 a. m.	Taft—No. 1, 10 a. m.
Dr Kedzie—2 p. m. Mrs. Mayo—2 p. m.	Taft—No. 2, 2 p. m. Mrs. Mayo—2 p. m.	Taft—No. 1, 2 p. m. F. S. Kedzie—No. 1, 3 p. m. Mrs. Mayo, 2 p. m.	F. S. Kedzie—No. 1, 2 p. m. Taft—No. 2, 3 p. m. Mrs. Mayo—2 p. m.
Redfern— 8 p. m.	Redfern—8 p. m.	Redfern—8 p. m.	Redfern, 8 p. m.
Conductor, Redfern.	Conductor, Taft.	Conductor. F. S. Kedzie.	Cond., Van Norman.

Barry trip—Second week.

Centreville, Jan. 27-28.	Coldwater, Jan. 28-29.	Jonesville, Jan, 29-30.	Dansville, Jan. 30-31.
Monday, Jan. 27.	Tuesday, Jan. 28.	Wednesday, Jan. 29.	Thursday, Jan. 30.
F. S. Kedzie—No. 1, 11 a. m.	Brown—No. 2, 11 a. m.	Brown—No. 1, 11 a..m.	Brown—No. 2, 11 a. m.
Brown—No. 1, 2 p. m. Van Norman—3:30 p. m.	Brown—No. 1, 2 p. m. Van Norman—3:30 p. m.	Taft—No. 1, 2 p. m. Van Norman—3:30 p. m.	Brown—No. 1, 2 p. m. Van Norman, 3:30 p. m.
Noble—7:30 p. m. Holdsworth—8 p. m.	Noble—7:30 p. m. Holdsworth—8 p. m.	Noble—7:30 p. m. Holdsworth—8 p. m.	Noble—7:30 p. m. Holdsworth—8 p. m.
Tuesday, Jan. 28,	Wednesday, Jan. 29.	Thursday, Jan. 30.	Friday, Jan. 31.
Taft—No. 1, 10 a. m.	F. S. Kedzie—No. 2, 10 a. m.	Taft—No. 2, 10 a. m.	Barrows—No. 1, 10 a. m.
Taft—No. 2, 2 p. m. Mrs. Mayo—2 p. m.	F. S. Kedzie—No. 1, 2 p. m. Mrs. Mayo—2 p. m.	F. S. Kedzie—No. 1, 2 p. m. Mrs. Mayo—2 p. m.	F. S. Kedzie—No. 1, 2 p, m. Barrows—No. 2, 3 p. m. Mrs. Mayo—2 p. m.
Redfern—8 p. m.	Redfern—8 p. m.	Redfern—3 p. m.	K. L. Butterfield—8. p. m.
Conductor, Taft.	Conductor, F. S. Kedzie.	Conductor, Taft.	Conductor—K. L. Butterfield.

JACKSON TRIP.

Counties of Jackson, Lenawee, Monroe, Macomb, Oakland, Wayne, Washtenaw, and Livingston.

WORKERS AND TOPICS.

Hon. C. G. Luce—No. 1—The Farmer's Contribution to Society.
No. 2—Keeping up Fertility.
Prof. C. D. Smith—No. 1—Modern Methods of Butter Making.
No. 2—How Shall we Meet the Drouth?
A. W. Haydon—The Horse as a Factor in Civilization.
H. W. Mumford—Economical Methods of Sheep Feeding.
Robert Gibbons—Grading Grain.
Thomas Gunson—No. 1—Forcing Vegetables Under Glass.
No. 2—House Plants; What to Have and How to Care for Them in Winter.
John I. Breck—Adulteration of Food.
W. O. Hedrick—Taxation.
Dr. H. Edwards—The Morrill Idea.
Hon. F. W. Redfern—A Plea for Unity of Action Among Farmers.
K. L. Butterfield—Plows and Politics.
Miss Margaret M. Sill—Demonstration lectures in cooking. Woman's section.

First week.

Parma, Jan. 21-22.	Adrian, Jan. 22-23.	Petersburgh, Jan. 23-24.	Mt. Clemens, Jan. 24-25.
Tuesday, Jan. 21.	Wednesday, Jan. 22.	Thursday, Jan. 23.	Friday, Jan. 24.
Mumford—11 a. m.	Gibbons—11 a. m.	Gibbons—11 a. m.	Luce—No. 2, 11 a. m.
Smith—No. 1, 2 p. m.	Smith—No. 1, 2 p. m. Miss Sill—2 p. m.	Smith—No. 2, 2 p. m.	
Hedrick—7:30 p. m. Breck—8 p. m.	Hedrick—7:30 p. m. Breck—8 p. m.	Hedrick—7:30 p. m. Breck, 8 p. m.	Hedrick, 7:30 p. m. Luce—No. 1, 8 p. m.
Wednesday, Jan. 22.	Thursday, Jan. 23.	Friday, Jan. 24.	Saturday, Jan. 25.
Luce—No. 2, 10 a. m. Gunson—No. 2, 10:50 a. m	Mumford—10 a. m.	Haydon—10 a. m.	Haydon—10 a. m. Gibbons—10:30 a. m.
Haydon—2 p. m. Edwards—3 p. m.	Haydon—2 p. m. Miss Sill—2 p. m.	Smith—No. 1, 2 p. m. Mumford—3 p. m.	Smith—No. 1, 2 p. m. Mumford—3 p. m K. L. Butterfield—4 p.m.
Luce—No. 1, 7:30 p. m.	Edwards—7:30 p. m. Luce—No. 1, 8:15 p. m.	Edwards—8 p. m.	Breck—7:30 p. m. Edwards—8:15 p. m.
Conductor, Luce.	Conductor, Mumford.	Conductor, Smith.	Conductor, Luce.

Jackson trip—Second week.

Pontiac, Jan. 27-28.	Wayne, Jan. 28-29.	Ypsilanti, Jan. 29-30.	Howell, Jan. 30-31.
Monday, Jan. 27.	Tuesday, Jan. 28.	Wednesday, Jan. 29.	Thursday, Jan. 30.
Gunson—No. 2, 11 a. m.	Smith—No. 2, 11 a. m.	K. L. Butterfield—10 a. m. Mumford—10:30 a. m.	Gibbons—11 a. m.
Smith—No. 1, 3 p. m. Miss Sill—2 p. m.	Gunson—No. 1, 3 p. m.	Gunson—No. 1, 3 p. m.	Luce—No. 2, 3 p. m.
Hedrick—7:30 p. m. Luce—No. 1, 8 p. m.	Hedrick—7:30 p. m. Luce—No. 1, 8 p. m.	Hedrick—7:30 p. m. Luce—No. 1, 8 p. m.	Hedrick—7:30 p. m. Luce—No. 1, 8 p. m.
Tuesday, Jan. 28.	Wednesday, Jan. 29.	Thursday, Jan. 30.	Friday, Jan. 31.
Mumford—10 a. m.	Haydon—10 a. m.	Smith—No. 2, 10 a. m.	Haydon—10 a. m.
Haydon—2 p. m. K. L. Butterfield—3 p. m. Miss Sill—2 p. m.	Smith—No. 1, 2 p. m.	Smith—No. 1, 2 p. m. Haydon—3 p. m.	Smith—No. 1, 2 p. m. Mumford—3 p. m.
Breck—7:30 p. m. Edwards—8:15 p. m.	Breck—7:30 p. m. Edwards, 8:15 p. m.	Breck—7:30 p. m. Edwards—8:15 p. m.	Breck—7:30 p. m. Redfern—8:15 p. m.
Conductor, Mumford.	Conductor, Smith.	Conductor, Mumford.	Conductor, Luce.

Eaton County.

This institute was held at Charlotte, Feb. 19-20, the date being set so late by special request. The assignments of Board speakers was as follows:

Wednesday, Feb. 19.

1:15 p. m. Wheats for Michigan, Dr. R. C. Kedzie, Agricultural College.
3:00 p. m. Keeping up soil fertility, Hon. C. G. Luce, Coldwater.
8:00 p. m. Plows and Politics, K. L. Butterfield, Superintendent Institutes.

Thursday, Feb. 20.

10:00 a. m. The Dairy Herd, J. H. Brown, Climax.
3:00 p. m. Soil Manipulations, J. H. Brown, Climax.
8:00 p. m. The Farmer's Contribution to Society, Hon. C. G. Luce, Coldwater.

Mrs. Mayo conducted a woman's section Thursday afternoon.

FARMERS' INSTITUTE SOCIETIES

ORGANIZED TO MAY 1, 1896.

WITH DATES OF ORGANIZATION UNDER THE LAW OF 1895, AND LIST OF OFFICERS FOR 1896-7.

County.	President.	Address.	Secretary.	Address.	Date of organization.	Membership.
Alcona	J. Van Buskirk	Harrisville	Geo. E. Gillam	Harrisville	Aug. 6, 1895	28
Alger [1]						
Allegan	F. W. Robinson	Fennville	L. C. Root	Allegan	Oct. 26, 1895	78
Alpena	E. O. Avery	Alpena	E. H. Toland	Ossineke	Jan. 8, 1896	27
Antrim	C. E. Mills	Mancelona	D. W. Marsh	Mancelona	Aug. 29, 1895	80
Arenac [1]						
Baraga [1]						
Barry	John Dawson	Hastings	R. M. Bates	Hastings	Aug. 3, 1895	112
Bay	F. Marston	Bay City	E. R. Phillips	Bay City	Aug. 24, 1895	70
Benzie	Perry G. Holden	Benzonia	R. B. Reynolds	Frankfort	Aug. 15, 1895	74
Berrien	C. H. Farnum	Benton Harbor	C. B. Groat	Niles	Jan. 17, 1896	52
Branch	L. M. Marsh	Gilead	A. J. Aldrich	Coldwater	July 27, 1895	175
Calhoun	Jacob Wartman	Albion	Wm. A. Powell	Marshall	Jan. 24, 1896	110
Cass	T. T. Higgins	Dailey	W. W. Reynolds	Cassopolis	Jan. 24, 1896	98
Charlevoix	M. M. Burnham	East Jordan	E. B. Ward	Charlevoix		57
Cheboygan	Jas. Fenton	Manning	C. F. Smith	Cheboygan	Aug. 29, 1895	
Chippewa	H. A. Osborn	Sault Ste. Marie	T. R. Easterday	Sault Ste. Marie	Aug. 19, 1895	63
Clare [1]						
Clinton	Decatur Bross	St. Johns	Geo. N. Ferrey	St. Johns	Jan. 22, 1896	43
Crawford	Oscar Palmer	Grayling	Henry Funck	Pere Cheney	Nov. 15, 1895	51
Delta [1]						
Dickinson	C. T. McElroy	Norway	L. F. Springer	Norway	Aug. 26, 1895	25
Eaton [2]	Jas. H. Gallery	Eaton Rapids	Geo. A. Perry	Charlotte		
Emmet	John Swift	Harbor Springs	Byron Bartlett	Harbor Springs	Jan. 14, 1896	65
Genesee	Geo. W. Stuart	Grand Blanc	Jas. A. Button	Flint	Aug. 17, 1895	86
Gladwin	H. R. Clark	Gladwin	Edgar B. Lamphear	Gladwin	Aug. 12, 1895	39
Gogebic [1]						
Grand Traverse	Sam'l H. Sayler	Yuba	E. O. Ladd	Traverse City		
Gratiot	I. N. Cowdrey	Ithaca	C. A. Van Deventer	Ithaca	Jan. 30, 1896	76
Hillsdale	A. B. Cummings	Camden	Earl H. Dresser	Jonesville	Aug. 20, 1895	90

FARMERS' INSTITUTE SOCIETIES.—CONTINUED.

County.	President.	Address.	Secretary.	Address.	Date of organization.	Membership.
Houghton ¹						
Huron	John Hunt	Verona Mills	Mrs. Geo. Pangman	Verona Mills	Jan. 22, 1896	211
Ingham	Wm. H. Howlett	Dansville	L. H. Ives	Mason	Aug. 31, 1895	72
Ionia	Luther E. Hall	Ionia	C. I. Goodwin	Ionia	Aug. 3, 1895	227
Iosco	John Preston	Tawas City	Geo. Anshuety	Tawas City	Aug. 7, 1895	11
Iron	Wm. Greig	Iron River	P. O'Brien	Iron River	Sept. 21, 1895	36
Isabella	Wallace W. Preston	Mt. Pleasant	Michael E. Kane	Mt. Pleasant	Aug. 2, 1895	72
Jackson	E. A. Croman	Grass Lake	H. A. Ladd	Brooklyn	Aug. 15, 1895	80
Kalamazoo ¹						
Kalkaska	A. E. Palmer	Kalkaska	D. P. Rosenberg	Kalkaska	July 20, 1895	80
Kent	R. D. Graham	Grand Rapids	W. K. Munson	Grand Rapids	July 9, 1895	359
Keweenaw¹						
Lake	Spencer Freedenbergh	Chase	J. G. Rogers	Chase	Aug. 24, 1895	32
Lapeer	Wm. W. Stickney	Lapeer	G. W. Carpenter	Lapeer	Aug. 10, 1895	75
Leelanau ¹						
Lenawee²	Geo. B. Horton	Fruit Ridge	H. H. Ferguson	Adrian		
Livingston	J. B. Tazziman	Oak Grove	F. D. Filkins	Oak Grove	Jan. 31, 1896	54
Luce¹						
Mackinac¹						
Macomb	John McKay	Romeo	Geo. A. True	Armada	Sept. 14, 1895	47
Manistee	Jacob Sears	Harlan	J. Herbert Read	Harlan	Aug. 24, 1895	60
Marquette	Robt. Blemhuber	Marquette	F. H. Vandenboom	Marquette	Aug. 31, 1895	25
Mason	Jerome Harman	Ludington	W. J. Meisenheimer	Ludington	Jan. 8, 1896	32
Mecosta	Geo. W. Fuller	Morley	Mrs. C. H. Ludington	Morley	Sept. 14, 1895	69
Menominee	Edward Sawbridge	Stephenson	Norwood Bowers	Stephenson	Oct. 29, 1895	21
Midland	James G. Culver	Midland	Frank H. Olmsted	Midland	Jan. 15, 1896	51
Missaukee	Harvey Bartholomew	Pioneer	Jas. E. Wright	Lake City	Aug. 1, 1895	
Monroe	E. L. Lockwood	Petersburgh	J. W. Morris	Monroe	Jan. 24, 1896	64
Montcalm	N. L. Otis	Palo	Geo. H. Lester	Carson City	Sept. 14, 1895	54
Montmorency ¹						
Muskegon	Geo. Bolt	Bailey	Chas. E. Whitney	Muskegon	Aug. 3, 1895	67
Newaygo	E. C. Tinney	Fremont	W. C. Stuart	Fremont	Jan. 10, 1896	53
Oakland	Peter Voorheis, Jr.	Pontiac	Charles S. Bartlett	Pontiac	Sept. 4, 1895	
Oceana	F. J. Russell	Hart	W. N. Sayles	Hart	Jan. 14, 1896	65
Ogemaw	C. J. Phelps	Damon	H. S. Karcher	Rose City	Aug. 8, 1895	50
Ontonagon					Aug. 22, 1895	40
Osceola	O. L. Millard	Hersey	Will L. Richards	Hersey	Aug. 24, 1895	66
Oscoda	C. M. Comins	McKinley	Robert Kittle	Biggs	July 23, 1895	22

Otsego	Jos. Glasson, Sr.	Gaylord	J. Berdine Scott	Gaylord	July 26, 1895	45
Ottawa[1]						
Presque Isle[1]						
Roscommon	James H. Sly	Roscommon	Wm. F. Johnston	Roscommon	July 22, 1895	
Saginaw	Henry M. Youmans	Bridgeport	Jas. A. Slocum	Saginaw, W. S.	Aug. 31, 1895	44
Sanilac	Richard Pearson	Urban	E. M. Denton	Sanilac Centre	Sept. 11, 1895	100
Schoolcraft[1]						
Shiawassee	Elmer Warren	Ovid	Chas. B. Cook	Owosso	Jan. 29, 1896	128
St. Clair	Chas. S. King	Port Huron	Moses F. Carlton	Port Huron	Aug. 10, 1895	27
St. Joseph	C. A. Tyler	Nottawa	B. F. Wilcox	Centreville	Jan. 28, 1896	129
Tuscola	Chas. Selden	Vassar	Fred H. Orr	Caro	Aug. 10, 1895	30
Van Buren[1]						
Washtenaw	Wm. E. Stocking	Ann Arbor	H. Stumpenhusen	Rawsonville	Sept. 14, 1895	119
Wayne	J. H. Vreeland	Wyandotte	J. H. Hanford	Plymouth	Aug. 14, 1895	174
Wexford	Barton Calvin	Wexford	Elwood Peck	Cadillac	Sept. 19, 1895	65

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[1] Counties not organized under law of 1895, at this date, May 1, 1896.

[2] County agricultural societies acting as institute societies under the rules of the State Board of Agriculture.

FINANCIAL STATEMENT.

The following is table of expenses on account of Farmers' Institutes to May 1, 1896. The fund for the year ending June 30, 1896, is $5,000.

Salaries	$1,602 25
Travel	2,461 06
Stationery and printing	156 23
Apparatus	25 60
Sundry	11 47
Farm Home Reading Circle	86 80
	$4,343 41

"Salaries" includes salary of Superintendent, $50.00 per month; salary of Stenographer for six months at $32.50 per month, and per diem of lecturers named in Class II. of list of lecturers, found on another page.

"Travel" includes all hotel, railway and general traveling expenses of all workers at Institutes.

The law allows an expenditure from the Institute fund of not over $200 per year for the maintenance of the "Farm Home Reading Circle."

A more detailed statement of the Institute expense account for the year ending June 30, 1896, will appear in the report of the Secretary of the State Board of Agriculture, bearing that date.

FIRST ANNUAL

MICHIGAN ROUND-UP FARMERS' INSTITUTE.

HELD AT GRAND RAPIDS, MICHIGAN, ON FEBRUARY
11, 12, 13, 14, 1896,

UNDER THE LOCAL AUSPICES OF THE

KENT COUNTY FARMERS' INSTITUTE SOCIETY.

Edited from a stenographic report made by Miss Harriet E. Speir of Grand Rapids.

PROGRAM.

PUTMAN HALL, NOS. 62—64 PEARL ST.

Tuesday Evening, Feb. 11, 7:30 o'clock.

A Word of Greeting	L. J. Rindge, Grand Rapids
Address	Gov. John T. Rich, Lansing
"The Purpose of an Agricultural College"	Dr. Howard Edwards, Ag'l College
"Food Adulterations"	W. L. Rossman, State Analyst, Lansing

Wednesday Morning, Feb. 12.

9:30	"Cultivation and Care of Peaches"	Roland Morrill, Benton Harbor
9:50	Discussion, led by	C. J. Monroe, South Haven
10:15	"Marketing Peaches"	R. D. Graham, Grand Rapids
10:30	Discussion, led by	Charles A. Sessions, Shelby
10:50	"Peaches in the Interior of Michigan,"	H. P. Gladden, Agricultural College
11:05	Discussion, led by	H. O. Bramin, Grand Rapids
11:20	"Bees and Horticulture"	Prof. W. B. Barrows, Agricultural College
11:40	Discussion, led by	Jos. A. Pearce, Grand Rapids

Wednesday Afternoon.

1:30—"Currants and Gooseberries"----J. N. Stearns, Kalamazoo
1:50—Discussion, led by----Z. V. Cheney, Grand Rapids
2:10—"Successful Strawberry Growing"----R. M. Kellogg, Ionia
2:30—Discussion, led by----Thos. Wilde, Herrington
3:00—"The Value of Spraying in Horticultural Economy"---Prof. L. R. Taft, Agricultural College
3:30—Discussion, led by----W. K. Munson, Grand Rapids

Wednesday Evening.

7:30—The "Farm Home Reading Circle"----H. W. Mumford, Agricultural College
8:00—"Forcing Vegetables under Glass"----Thos. Gunson, Agricultural College
8:30—"A Plea for Unity of Action Among Farmers"--Hon. F. W. Redfern, Maple Rapids

Thursday Morning, Feb. 13.

9:30—"Economical Methods of Sheep Feeding"----H. W. Mumford
9:50—Discussion, led by----Hon. H. H. Hinds, Stanton
10:10—"Will Feeding for Beef Pay in Michigan?"---Hon. W. E. Boyden, Delhi Mills
10:30—Discussion, led by----Maj. A. F. Kelsey, Ionia
10:50—"Practical Methods in Stock Breeding"----Hon. Wm. Ball, Hamburgh
11:15—Discussion, led by----H. G. Holt, Cascade

Thursday Afternoon.

1:30—"The Dairy Herd—Breeding"----J. H. Brown, Climax
1:50—Discussion, led by----Aaron Clark, Middleville
2:10—"The Dairy Herd—Feeding and Care,"-Prof. C. D. Smith, Agricultural College
2:40—Discussion, led by----L. J. Rindge, Grand Rapids
3:00—"The Babcock Tester"----J. H. Brown
3:30—"Making Good Butter," illustrated with dairy apparatus, G. H. True, Agricultural College

Thursday Evening.

7:30—"The Michigan Experiment Station"----Prof. C. D. Smith
8:00—"The Boiling Point"----Prof. P. B. Woodworth, Agricultural College
8:30—"Forest Fires," illustrated lecture,----Dr. W. J. Beal, Agricultural College

Friday Morning, Feb. 14.

9:30—"Water in the Soil"----Hon. A. C. Glidden, Paw Paw
9:50—Discussion, led by----Lewis G. Solomon, Dutton
10:15—"Commercial Fertilizers—Is Their Use Profitable for the General Farmer?" Prof. F. S. Kedzie, Agricultural College
10:40—Discussion, led by----E. C. Bearce, Grand Rapids
11:00—"The Present Standing of Ensilage as a Food for the Various Kinds of Stock," Hon. I. H. Butterfield, Agricultural College
11:20—Discussion, led by----Henry J. Martin, Vermontville

Friday Afternoon.

1:30—"Growing Potatoes"----I. N. Cowdrey, Ithaca
1:50—Discussion, led by----L. J. Post, Lowell
2:15—"Forage Crops"----A. A. Crozier, Agricultural College
2:35—Discussion, led by----Franklin Barnhart, Grand Rapids
3:15—"Wheats for Michigan"----Dr. R. C. Kedzie, Agricultural College

Friday Evening.

7:30—"Taxation"........................Prof. W. O. Hedrick, Agricultural College
8:00—"The Farmer's Contribution to Society"..............Ex-Gov. Cyrus G. Luce

WOMAN'S SECTION.

Y. M. C. A. BUILDING, COR. PEARL AND IONIA STS.

Conductor..Mrs. Mary A. Mayo, Battle Creek

Wednesday Afternoon, Feb. 12.

THE KITCHEN,

1:30—"Kitchen Economy" illustrated with kitchen appliances,
Miss Margaret M. Sill, Detroit
Discussion, led by..Mrs. Mary A. Mayo
3:00—"The Chemistry of the Kitchen"......Prof. F. S. Kedzie, Agricultural College
3:45—Discussion, led by..............................Mrs. M. M. Koon, Grand Rapids

Thursday Afternoon, Feb. 13.

THE RURAL HOME.

1:30—"Making Housework Easier"..............................Mrs. Mary A. Mayo
2:00—Discussion, led by..............................Mrs. H. Gaylord Holt, Cascade
2:30—"Saving Steps"..................................Mrs. Wm. T. Adams, Paris
3:00—"Art in the Rural Home"........Prof. W. S. Holdsworth, Agricultural College
3:45—Discussion, led by...........................Mrs. Sarah Smith, Grand Rapids

Friday Afternoon, Feb. 14

MOTHER AND DAUGHTER.

1:30—"Mother and Daughter"..................................Mrs. Mary A. Mayo
"A Mother's View"......................Mrs. James B. Smith, Grand Rapids
"The Daughter's Side"..............Mrs. Myrtle Koon Cherryman and others
"A Physician's Counsel"..................................Dr. Maria W. Norris
General Discussion.

MECHANICAL SECTION.

Y. M. C. A. BUILDING, COR. PEARL AND IONIA STS.

Conductor ________________________________Secretary C. S. Ward, of the Y. M. C. A.

This section was organized in the interests of the young mechanics and those who are thinking of entering a mechanical career. The lectures were given by Prof. Chas. L. Weil, assisted by Professors Chamberlain and Westcott, of the State Agricultural College.

The subjects treated were: "Materials of Construction," "Mechanical Designing," "Steam and Steam Engines."

TUESDAY EVENING.

The meeting was called to order by Kenyon L. Butterfield, State Superintendent of Institutes, who said: It seems to devolve upon me to start the ball rolling, and I will say just a word in regard to what sort of meeting this is, though probably most of you know already. During the past winter, there have been held in the State sixty-seven Farmers' Institutes, in as many counties, under the law passed by the Legislature appropriating $5,000 for the purpose of putting an Institute into every county that wants one. These Institutes have been held at various times since the first of October, and almost uniformly with good results in interest and enthusiasm. Last fall it was decided that about this time there should be held, here in Grand Rapids, a "Round Up" meeting—*rounding up* the Institute work of the season, and it has been planned with a view to making it the best that could possibly be offered to the farmers of Michigan. We trust that the program that has been arranged will bear out the hopes of those who have made it. Without further remarks I will introduce Hon. Franklin Wells, President of the State Board of Agriculture, who is Chairman for the evening.

Mr. Wells: I notice from looking at the program that every moment is full, and I will make no remarks, but take pleasure in introducing to you the first speaker of the evening, Mr. L. J. Rindge, of Grand Rapids.

A WORD OF GREETING.

MR. L. J. RINDGE, GRAND RAPIDS.

To me it is a great pleasure to be able to extend to you the hospitality of our city, well knowing that during your short stay here the city of Grand Rapids will do all in her power to make it pleasant for you. I speak more especially for the business men of Grand Rapids. We are in full sympathy with you in what you are endeavoring to accomplish.

Good luck, a term much used in farming communities, but not always correctly defined, is nothing more than good management, and such meetings as these that you are about to hold are of great value not only to the country, but to the cities and towns of the State. They assist in the development of knowledge; teach us how to care for the stock, that it may be properly housed, better and more economically fed; to avoid the waste of coarse fodder raised on the farm land, and which otherwise simply produces an unpleasant sight for the eye; that we must raise more and finer fruits, marketed in packages nicely put up, so that they will show to the best advantage and secure the best market prices. Meetings of this kind are productive of great good. We think more of our neighbors, because we know them better, and farmers are more often called upon to lend a helping hand to their neighbors than others, and this gives them the advantage of the greatest good there is in life.

The ladies, God bless them, will have no small part in this meeting, and they will attend to their part thoroughly, and if the instructions here given about lightening the labors of the wives and daughters are going to help to make the home life pleasanter and happier, great good will have been accomplished.

ADDRESS.

GOV. JOHN T. RICH.

I am disposed to talk to you tonight about our State government. It is a matter in which you are all interested, and while in many respects it is of the utmost importance to every man, woman, and child in the State, yet its effects are of such a character that unless your attention is called to it, you would never know we had a government, except for the tax collector who calls once a year and asks contribution to its support.

It is a fair question in these times, when everyone's income is being reduced, and everyone is looking for some means of curtailing expenses, to ask whether this State government of ours is really worth what it costs.

In the first place, it costs on the average throughout the State, about one-tenth of your aggregate taxes. You who live in a township where taxes are light and you are not paying a high county tax, and your school taxes are light, will find that it is a good deal more. In other places where taxes are high you will find it considerably less. This year the State tax is $2\frac{2}{3}$ mills upon the assessed valuation of the State, and the average taxes throughout the State are just about ten times that, or $2\frac{2}{3}$ per cent. Your taxes on the average are about two millions of dollars per year; they vary, from time to time, from one and one-half millions, to this year, three millions. One time with another, you may not expect in the near future to have taxes less than about an aggregate of two million dollars a year, unless, as has been done in the past, some of the expenses are carried over for the future, which is the reason your taxes are higher this year than in other legislative years. Appropriations are no larger than repeatedly before.

NOW IS THIS GOVERNMENT WORTH WHAT IT COSTS?

I will make a statement of the expense of the government in another way. We have two and one-half millions of inhabitants in this State, and for the average of the last six years it has been about eighty cents per capita, for each man, woman, and child in the State—that is your average of taxes per year. Then you get back 42.cents in the way of primary school fund. Subtract this, and it leaves you about thirty-eight cents per capita, for the entire expense of the State government of Michigan. When you come to put it in that light, and think of the benefits you have, do you believe it is a very expensive government after all? What do you get for this expenditure? First, there are the ordinary expenses of State government—the State officers, the expenses of the Legislature, clerks of the various departments, etc.

Next, come the educational institutions. We are paying one-sixth of a mill—perhaps one-fifth is nearer—upon your aggregate valuation, for the support of the University. You are paying a smaller amount for the support of the Agricultural College; a considerably larger amount for the support of the Mining School, and quite an amount for the support of the State Normal School. I realize that in speaking of this, I strike a great many people who doubt the wisdom of these institutions. At many times the expenses of the educational institutions exceed what, as farmers, we would think was necessary, but on the whole, it seems to me that you would very much better pay what you do, than not to have them at all.

I know that in the educational system comparatively few farmers' sons get the benefits of these educational advantages, but you would hardly want to enact laws in such a way as to make it possible for only rich men's sons to get the benefit of a liberal education. All cannot have it, but when you consider the aggregate of the tax—while in some cases there is more than we realize—I don't believe the farmers of Michigan desire to say, "We will bar our sons, and the sons of our poorer neighbors, from enjoying a liberal education, and give it entirely to the rich men."

Our University is pretty broad. Possibly it invites too many people from outside, it possibly has too many *professors*, but after all, it is a poor man's college. The rich men, even of this State, are very liable to send their boys to the eastern colleges which have, as they think, more reputation; yet so far as results are concerned, our University stands the peer of any of them.

With regard to the Agricultural College. It is hardly necessary to mention that school in agricultural and horticultural meetings. It ought to have the earnest, hearty support of every farmer in Michigan, and in fact of everyone who wishes this commonwealth well.

The influence of the Normal School reaches perhaps further than any of the others, because that educates the teachers who, in turn, educate our pupils. Up to this time, the graduates of this institution are absorbed by the larger towns and schools in the State; but take away the influence of the Normal School, and it would make a terrible inroad into our educational facilities and results.

The Mining School is located in the Upper Peninsula and is perhaps no direct benefit to the farmer, but mining is a very great industry in this

State, and it is probably not unwise to have it taught and learned scientifically, and for that reason the Mining School has been created. Many of us would think that this is a tax that we could dispense with, but it is established, and we have to meet it.

THE PRIMARY SCHOOL FUND.

Now the State government goes a little further, and we are indebted to the framers of our constitution—people who came here when the State was a wilderness, for the support that our common schools are receiving. The general government provided that Section 16 of every township should be sold and devoted to schools. The framers of our constitution went further and said that when the State debt was paid, all specific taxes should go to and become a part of the primary school fund of the State. You haven't had any State debt for fifteen years, so this all goes to make up your school expenses. Take it in an ordinary place, and you may say it is as broad as it is long; what you get in school money you pay back in taxes, but in some places it is different. One county for years got three dollars back in primary school money for every two dollars paid the State in taxes. It was in a county where there were comparatively small valuations; but for this it would have been impossible to have maintained the schools in that county as they were and are maintained.

The next two items are our State prisons and insane asylums. It does not make much difference what the management is—except the contract management of the prisons—about the expense of these institutions. The care of your insane costs you ordinarily now one-half million each year, and this is for the State patients alone. Then there are patients who have not been in the asylum more than two years, the expense being paid by the county. Those people who are able to pay for the support of their friends do so, the rate being fixed at $3.45 per week. But this is not a question of appropriation, because whenever the board make up their bills for the month, they send them to the Auditor General, County Treasurer and individual at the same rate per week. The prisoners you can't turn out, and it is not always possible to employ them profitably. At the Jackson prison sometimes the receipts are equal to the running expenses. This has never been the case with the institution at Ionia, and it may reasonably be questioned whether in the near future it will be. It is a reformatory for one thing. There are short term prisoners and young men. I am not aware of any similar institution which has been made to pay, but they are coming nearer it this year. I have questioned the necessity of the prison at Marquette, for the expense of taking care of your prisoners there is relatively larger than in this peninsula. The prison is there, however. We have these institutions and no one can question the necessity of maintaining them. It costs about $750,000 a year to maintain them, and the educational institutions have in round numbers $400,000 more, per year.

REFORMATORY SCHOOLS.

Then you have the Institution at Lansing for the care of boys and the one at Adrian for the care of girls, saving them from becoming paupers and possibly criminals. At these institutions they are given the rudiments of an education and training, and after careful investigation are sent out among the families of the State, where they will be in good hands, and the State looks after them until they are able to take care of themselves. Suppose you say nothing about the humanitarian aspect of this question, from a pecuniary standpoint alone I believe the money expended for these institutions pays a larger interest to the people of the State of Michigan than any private investment which any of us are making.

Of the twenty institutions we have, each one is controlled by a board of citizens, appointed by the Governor and confirmed by the Senate, for a long term of years. These men give their services, being reimbursed only for their actual expenses. When you consider that you are expending on these institutions a million dollars a year, and that this amount is increasing; that you have never had a defalcation resulting from these boards; that your money has been dispensed as carefully as private individuals care for their own investments, and that it is done without reward—it is something that the people of the State of Michigan ought to feel thankful for. There is one gentleman on the platform here tonight, who has served more than his majority—something like twenty-three years, on one board, and I was figuring it out today, that he must have given nearly two full years of working time to the services of the State, with no compensation except the feeling that he is doing his duty working for the interests of Michigan.

Then speaking again of the departments of the government. In addition to the constitutional officers that you have, there is a Commissioner of Insurance; did you ever think anything about the value of his services? You probably knew in a general way that there was such an officer, but did he ever do you any good? Let us see. Every prudent man insures his place, and ordinarily he provides for his family in part at least, by insuring his life. It is the duty of this Commissioner to see that these companies fulfill their contracts, and it is so seldom that they fail, that you hardly realize that there is any necessity for looking out for your interest; but for that, no one can tell the loss that might occur.

The Commissioner of Railroads stands between the railroads and their employees. He has large powers and is expected to do justice. You are not able to cope individually with the corporations, but I believe that the corporations are in as good order, and are complying as fully with the law in Michigan as in any state in the Union. But for this Commissioner you might have a good deal of trouble. There are several others—a Food Commissioner, a Labor Commissioner, and a Bank Commissioner, who are very important factors in this government, in looking after our interests.

THE BOARD OF CORRECTIONS AND CHARITIES

Is another gratuitous Board—there is a provision now that they have one agent in every county in the State, at an expense not to exceed $100 a year. What are their duties? If there are any children sent out from any of these institutions they are to look after them, to see that the families where they are placed are proper ones, and that what is necessary is done. If a child is arrested, or found without care on the streets, it is the duty of the County Agent to take care of him, and many times they are kept from going to the Industrial School, are found good places in families, and a great expense saved. There are some institutions I have not mentioned; there is the institution for feeble minded. What is the purpose of that? It is to take the feeble minded children out of society; to relieve the families where they are a skeleton in the closet, and detain them and prevent their multiplying their kind to pollute society. I might go on for two hours and tell you of such things but you have a long program before you, and I will detain you but a moment longer. In addition to this, you have about forty circuit judges in the State, who are paid from this fund. You have the supreme court judges and their secretaries and all the other paraphernalia of a great state, which go to make up state government.

You scarcely realize that you have it, but if you will look this matter over, and consider what I have said in these brief moments about it, I believe you will realize that your State government is well worth what it costs. While the business of the State is not done as private people do business, it comes as near to it as any public business I know of. In some places there ought to be savings introduced—that always will occur. Some of you are supervisors perhaps; you take your dollar and a half a day, and you are not particular whether you work all the time or not. If you go on the Board of Supervisors your journal does not show that you do a great deal of work, but you draw your per diem just the same. It is a good deal this way in State work.

I want to call your attention to the road convention in Lansing in March. I hope all who can will attend that convention. I presume there will be some people there who will propose the most expensive and elaborate systems; these may not be practicable at this time. There will be others there, who will propose different systems by which we can improve them somewhat. It is to be held in response to requests from Saginaw and Bay City and Traverse City; it comes from a section of the State where the roads are different from what they are around Grand Rapids, where they are passable at any time; there, they have an alluvial soil, and when it is muddy the roads are impassable. They have had some experience with stone roads and are anxious for more. It is a matter in which we are all concerned, because cheap transportation has become one of the great questions of the day, and I hope as many of you as can, will come and take part in the convention.

FARMERS' INSTITUTES.

The holding of these Farmers' Institutes is another of the benefits that you get from the State government, and it seems to me that the Legislature acted wisely in appropriating $5,000 each year for this purpose. This sum has been spread over the State so that you have held sixty-eight Institutes this year. Who can tell the amount of benefit, amusement, and entertainment derived from these series of Institutes?

Farmers many times get the idea that legislation is against them. I don't know but it is sometimes, but I want to make this statement: I don't believe that there is one time in a thousand when there is legislation for one class that it does not react on the class that it is intended to benefit. Ordinarily speaking, there is a feeling that the farmer has not had a fair share in legislation. Yet, from time to time, you send good men to the legislature, and these men desire your approval. If they knew what would suit you—just what you wanted—don't you believe they would be willing to do that thing?

In this matter of legislation, we must look at both sides. For instance they may say that they will reduce the rate of interest. Take it in the past, what has been the result of that? Suppose you do lower the rate of interest, no one can compel a man to loan his money to you; he insists upon your paying an amount sufficient to repay him for his trouble. In case there are any unusual provisions made in regard to the payment of mortgages, what is the effect? The money lender asks you to pay that mortgage or comply with his demands. Wherever anything of this kind has been attempted it has been almost invariably with the same results. Whenever you attempt to go outside and favor a class, it has reacted on that class. All legislation should be for the "people," then there is no particular trouble and justice is done to all.

When you seek legislation, be sure you are right; be sure that somebody is not going to get the best of it. As a general rule, when you ask for laws that apply to all classes alike, with equal justice to all, the farmers fare better than from any special legislation I have known of.

I thank you, ladies and gentlemen, for your kind attention.

THE PURPOSE OF AN AGRICULTURAL COLLEGE.

DR. HOWARD EDWARDS, AGRICULTURAL COLLEGE.

Around this subject, as in fact around all educational topics, cluster a number of varying and even conflicting opinions, and it is idle for me to hope that all or even the majority of those who hear me tonight will agree with the views that I shall present. Nevertheless, a long and somewhat varied service in agricultural colleges, a favored position for the study of the educational problems involved, and the frequently recurring necessity for discussion and consultation on all the fundamental features of such schools, have given me some degree of confidence in the justice and value of my conclusions, and move me to ask your attention while I lay them before you.

In the discussion you will kindly bear in mind that most agricultural colleges, and our own in particular, have half their equipment, teaching force and students in a mechanical department. The mechanical department of the Michigan Agricultural College is enthusiastic, successful and thorough in this kind of work, and its graduates are eagerly sought for by factories, shops and the like. I should like to make some boast of this feature of our college and indicate the magnitude and importance of its work. But the audience present and the subject assigned me seem to demand that I speak entirely of agricultural education, and so, with no intentional derogation either of the importance or magnitude of the mechanical side of the college, I shall confine my remarks to the Agricultural College as such.

If I am restricted to *one* purpose, purpose in the singular number, I shall say that the purpose of an agricultural college is to elevate by education the status of farming—to enable it to keep pace with the progress of the age—to be to it and do for it what the normal school does for teaching, the naval school for navigation, the theological school for preaching, or the medical school for the healing art.

In attaining this end there are three ways through which it works, and I place them in their order of importance, as I see it.

(1) By educating for farming boys and girls that desire to be farmers; (2) by helping with short and special courses those that, having already engaged in life's work, find themselves because of insufficient preparation or changed circumstances, competing at a disadvantage, and (3) by dignifying the profession of agriculture.

Let us now consider briefly the methods by which it accomplishes these three results, taking them up in the order I have named:

BOYS AND GIRLS TOGETHER.

(1) To educate the boy and girl who look forward to life and work on the farm as their future occupation. I have intentionally included the girls in this class, and for several reasons. The farmer's wife is as

important a factor in the success of farm operations as is the farmer himself. If he provides, she must administer. And more, she almost invariably has the management of the dairy and the poultry, and frequently thereby contributes half the income, besides ruling with a wise and careful hand the outgo. For this, she needs an education, and an education parallel with and equal in extent to that of the farmer, her husband. Science in the kitchen and in the household counts for as much in preserving health, in making life worth living, in lending to farm life those woefully needed features, interest and variety, in lessening expenditures and making the balance on the right side, as it does in the fields or orchards, or stock-yard. Still further, who is it that is to guide the infant mind, to care for its health, to mould its purposes, to set its goals of ambition, to create its atmosphere of effort and achievement? Ah! it is here that the mother is supreme. If she believes in farm life, understands the intricacies of its operations, is able intelligently to discuss the knotty problems of planning and managing as they arise, is thoroughly interested in the work and loyal and enthusiastic for the calling, there is no question about the children's interest in it. From Hannah on down through the ages it is the mothers who have added recruits to the pulpit and the missionary field. No theological school has ever exerted a tithe of the moulding influence of a mother's faith, a mother's love, a mother's ambition softly breathed into the half-attentive ear of the boy at her knee; and sometimes, working against tremendous odds, it has transfigured the most stubborn and rebellious dispositions. Such an influence exerted for the farm is all powerful. And then, if to the mother's influence is added the interest of the sweetheart, have we not made assurance doubly sure and taken a bond of fate for the future of the boy? Let the girl be wedded to the farm and I will venture to say that the boy will be a fairly enthusiastic brother-in-law. But first the mother and the daughter must find interest in this farm life and work, and through education must make that interest intelligent. Such education is the business of an agricultural college. That when properly trained women are a power on the farm as everywhere else is proved by actual example. The most enthusiastic, intelligent, successful practical farmer at one of the institutes last winter was a woman. In all subsequent remarks, then, be it understood that we mean to include both girl and boy.

I said a few moments ago that our mission was to educate for farming those who look forward to farming. It is useless for us to deceive ourselves. There is no known machine so constructed that you can put a young man in at one end, turn a crank for four years and bring him out at the other end a farmer; or a teacher, either, or a physician. The material, the previous bias, counts for everything. An Oliver Wendell Holmes may be educated first as a lawyer, then as a physician, but he makes his name world-famous as an author. A Walter Scott may spend years in studying for the law, but he turns out a novel writer. On the other hand, no amount of planing and binding and shaping can ever make of a twisted, gnarled tree-trunk a tall, stately mast. Possibly it might make an excellent, sturdy, shapely knee-timber. No amount of grinding, sharpening, polishing and pearl-handle setting can make a carving knife of a piece of soft iron. So, when, as lately occurred, I hear some man gloating over an agricultural college graduate who inherited a $5,000 farm and lost it all in three years' time, I think only of the soft iron and not of the shaping of the knife. The converse, also, is true. The excellence of the steel and its capability to cut with only very crude shaping argues nothing against its greater usefulness if ground and sharpened and polished and set in a suitable handle.

OUR STUDENTS.

Let us consider for a moment the character of our material. In Europe the question of agricultural education is one either of manual skill and rule-of-thumb methods for peasants who are set to given tasks by those in authority over them, and whose outlook is intentionally confined by the narrow limits of caste; or to scientific training in the direction and management of large estates either as landlords or as stewards. With us the material differs from them by all the width of heaven. First of all, the boy to be educated is a citizen, the peer of any other man; his outlook is not confined, but he has a world of opportunity before him. He will serve no master but himself, and the interests he has to subserve are his own and those of his colleagues. He generally is the son of a small farmer owning a farm of from forty to three or four hundred acres reclaimed probably by the farmer himself from wild nature. The function of an agricultural college is to make of such material men self-poised, self-governed, characterful; citizens, patriotic, intelligent, unselfish, faithful to the call of duty; farmers keen to observe, shrewd to apply inductions, familiar with the laws and forces of earth, and air, and sky, harnessing them and making of them slaves; ready with skill of hand and eye for all the varied duties and exigencies of farm life; farmers who, like manufacturers, produce at the very lowest cost with least waste and smallest wear-and-tear on machinery, and like merchants, sell at the highest market price, shrewdly look to the interests of their own class, guard it against unfair legislation, and stand for it against the encroachments of other classes.

Let us make no mistake here. No matter who says otherwise, the foremost task for the teacher in the presence of this young scion of our nobility, bearing the noblest name the heavens have yet heard—this free born *American*, the foremost and all-important task here is, I say, to make of him a *man*—a citizen. The proud old Roman's "civis Romanus sum" is pitiful beggary compared with the glorious birthright of this boy of today who can say "I am an American." But the dignity and honor of this title carries with it tremendous responsibility. He is to govern himself, he is to govern others. He must be prepared for his duties. At your peril put any other duty before this. I say shame on those who have reviled the agricultural college, because, taking immature, unformed boys and girls from the district schools and proposing to educate them for their duties in life as farmers, it has seen this as the first duty, has enlarged its curriculum so as to make of them *men* and not mere European beasts of burden skilled as the mere plow-horse is skilled, has made their work head-work, as well as hand-work, has shown them God's image in nature and not the mere impress of the dollar on earth and air and sky.

And in this making of men and women the courses at an agricultural college seem peculiarly fortunate.

THE TRAINING.

Toward this indirectly tends all the training he receives. The constant companionship with out-door nature, the great rewards she offers to obedience to law and the inexorable and terrible punishments she metes out to disobedience, the training of the mind through science to an impartial analysis of facts, the beauty and quiet charm of rural life and pursuits far from the mad ambitions, the glitter and tinsel, the crime and suffering of life's more crowded thoroughfares; the direction of physical energy along lines of useful and interesting work—these combined with the "blessed companionship of wise thoughts and right feelings," the high ideals and noble characters that live in our literature, the study of our political and social problems and duties, the training in justice of induction and deduction, in clearness and accuracy of expression, all tend to develop self-poise, self-dependence, manliness, a high plane of thought and action. And whatever may be though of our own Agricultural College, in this respect at least it may well invite comparison with any and all other colleges. Its list of graduates is an honor-roll of earnest, successful men, doing doughty service for the State and for society; and honored, wherever they are known, for sturdy manhood and sterling integrity. The College has been singularly successful in cultivating manhood and womanhood, ability to cope successfully with the world, to win its prizes and obtain its rewards without forsaking pure ideals or blotting the escutcheon of honor and character.

The second and distinctive feature of an agricultural college education is the technical one, and to this there are two parts, the training of the brain to know, to recognize, to draw conclusions in accord with general principles; and the training of the eye surely and trustworthily to observe, and the hand with ease, skill and precision to execute the mandates of the will.

SCIENCE THE BASIS.

There is only one true and solid basis for the farmers' technical head-training, and that basis is science. The farmers' implements, the machines in his factory, are soils, moisture, plants, animals; and his motive power is nature's forces of heat, light, electricity, surface tension, gravitation, chemical affinity and the subtle entity we call life. Now all that we know of these materials and forces constitutes *science*, and hence if the farmer would know his tools thoroughly he must know science. He stands in the first and closest contact with nature, and the more fully he can know her secrets, her forces and their lines of action, the more surely and the more economically can he produce his out-put, the more fully is he nature's master and not her slave. Shakespeare's story of Prospero, the magic wand, and its mastery over Ariel and Caliban, is but an adumbration of the 20th century farmer, who with the magic wand of science has mastered the subtile forces of air and earth. Now there are two possible lines of procedure with scientific teaching. One is to commence with the principles of the science, say chemistry; to teach the general characteristics of the elements and the laws of chemical affinity and combination; to proceed then to apply these laws in methods of qualitative and quantitative analysis; and finally to take up the application to agriculture of the principles and processes learned, ascertaining the chemical changes produced by light, heat and electricity in the growth of plants, the chemistry of plowing, fallowing, draining, chemical transformations taking place in various methods of preparing, preserving and composting manure; chemistry of the rotation of crops, etc. Such is the method to be used in a four-years' course with reference to all technical work; first thorough grounding in the principles of the science and then equally thorough and more extended study and practice in the applications of that science to the daily routine work of the farm.

PRACTICAL HINTS NECESSARY.

The other method of procedure in scientific teaching consists in giving short, dogmatic rules of practice, the results of scientific investigation, with just enough of explanation to make the rule intelligible, and little or no attempt to refer the rules to any basal principles of science. These rules, of course, must be emphasized and fixed in the mind by constant, actual doing. This method is good as far as it goes, and I am free to say that I think it has been too much neglected in our school instruction. In order to do the most for the farmer under actual, not theoretical or ideal conditions, the element of time must be carefully considered. The farmer does not find it always possible to give his son four years of technical training, while he may be able to give him one year or two. It is the duty of the agricultural college to meet this condition of things by supplying the necessary scientific instruction through this dogmatic method. The question should not be "How much pure science can I teach in a given time," but "What is the minimum amount of general science work necessary to give the best results when we come to utilize a certain definite amount of time in teaching the applications of science to agriculture?"

So far we have spoken of professional mental training, theoretical work. But like the surgeon's, the farmer's work is not all head-work; there is work of hand and eye as well. The theories, the applications of scientific facts must be constantly and persistently put into actual practice, for boys, on the farm, for girls, in the domestic economy of the household. In my opinion this required work should be entirely educational. Processes such, for instance, as the construction and operation of farm machinery, carpentry work, construction and filling of silos, dairy work of all kinds, preparation of ground for various crops, cultivation of crops, feeding stock, elementary blacksmithing, setting out plants and trees, budding, grafting, pruning and a hundred similar operations should be gone through until proficiency is attained; but as before familiar work should not consume time that could with better effect be used on more unfamiliar work, either of brain or of hand. I think, too, that skill in the more elementary operations, such as simple plowing, handling horses, milking, using an ax, a hoe and the like, should be made an entrance requirement, just as with reading, spelling, etc.

Such, as I conceive it, is a proper agricultural course of four years for the bright lad from the district school that wants to go back on the farm —character-training, brain-culture, hand-culture.

DO THEY FARM?

Just at this point comes the objector, and declares this process does not make farmers. The easiest and most seductive thing in the world is destructive criticism. It is so easy and soothing to one's estimate of one's own importance to put on a superior air and with sarcasm and invective declare that "Agricultural colleges are at present almost invariably run wrong, almost invariably diverted from their lawful purpose." It is only fair and just to presume that the man who makes such a statement knows a right way of running an agricultural college different from the actual method pursued. Yet I defy any man to point to any helpful suggestions of a constructive nature regarding agricultural courses in all the mass of passionate condemnation that has appeared in our newspapers. If the methods I have described constitute educating men away from the farm, then it means that the farmer does not need and must not have a full, logical, rational preparation for his life's work. It means that the better prepared a man is through study of basal principles of soil fertility and tillage, and the wider the inductions he is able to make from given data concerning plant diseases, the less likely he is to go to farming. Compare this statement with a similar one about the study of medicine. The more a man knows about the constitution of the human body the closer and more minute his knowledge of diseases and their symptoms, the less apt he is to become a physician. Everyone knows that the last statement is grotesquely untrue. Other things being equal the more thorough and extended the research into the basal sciences of medicine the better the physician. Now why, necessary changes in the statement being made, is this not true of agriculture? The sad truth in the matter is that our boys do not come to us as the medical student goes to his college. Our boys do not want to be farmers when they come to us. The condition of agriculture is such, the tone of conversation at home is so gloomy, that the boy imbibes no love for his future occupation. He becomes accustomed to looking around for a brighter horizon before he ever leaves the paternal roof.

SOME FIGURES.

When our boys enter, we ask them what they intend to become. The answers show that 50% are uncertain; 24½% expect to become mechanical engineers, and only 11% have enough ambition for farm life to desire to become farmers. Now put with this fact another, which any of you can verify for himself by computation from our graduates' catalogue; the effect of four years of education of the kind I have described is to more than double this percentage. Twenty-four per cent actually *have become* farmers. Before such a combination of facts, what becomes of the statement about educating away from the farm? *It is untrue.* The college is doing its full duty in counteracting the home influences that are drawing our boys away from the farm. It is unfair to compare our out-put with that of a medical college, because the conditions are so different. As you stand before an entering class in the medical department of our great university, ask that all who intend to be physicians will raise the right hand. How many hands would remain down? But with us in answer to the question: "How many intend to be farmers?" only eleven out of every hundred would raise the hand. Yet even a medical college does not make all its graduates physicians. Our Dr. Kedzie is a medical graduate of the U. of M., but the greater part of his long and useful career has been passed as a teacher. So little does youth know its own powers or is able to control its own destiny!

A FEW SUGGESTIONS.

There is, however, one change that, I think, would operate beneficially in this direction. Our Agricultural College has its vacation in the winter and is in operation during the summer. The avowed objects are twofold: (1) to give proper farm work during the summer, and (2) to enable our boys to teach during the winter. Now I think this practice works in a doubly hurtful way: on the one hand it keeps the boy from 10 hours per day during the summer of the best kind of farm drill either on the home place, or on the college farm. This would be comparable to the medical student's hospital-walking during his course, or to the summer campaign among the mines undertaken by the mining students at Houghton. On the other hand our boys are deliberately inducted into the teaching profession. Year after year three or four months are spent in teaching. The only form of money-getting they know anything about by actual experience is teaching. Before they know it they have come to depend on it for their support and in the absence of opportunity and initiative fall back into it after they are graduated. Moreover the middle class of farmers, those whom we desire to reach, can not spare their sons during the summer, but could arrange to let them go during the winter. I believe a change of vacation from winter to summer would give us at the College a class of boys that we have never reached before, namely those earnestly striving and sacrificing not for some kind or any kind of an education, but before all things for an agricultural education. Finally, it would give an opportunity for a great object lesson in the shape of a model farm—a farm conducted most sagaciously and tested by actual money tests, a farm for constant comparison and illustration when the students return from the summer campaign. This is not possible with 2½ hour per day student labor during the summer. But there is, besides the regular work for boys and girls, another work which the Agricultural College can and must do. I spoke of the second method of handling science teaching, viz., by dogmatic enunciation of facts and rules and constant practice in doing. It is the playing of poor Blind Tom, compared with the science and skill of a Liszt or a Rubinstein; but it is of infinite importance to Blind Tom and a source of pleasure and instruction to thousands. There are men who have time to know only what they can learn in six weeks; arrange for them; give them all that is possible in that time. There are those who are compelled to branch out into orcharding, or small fruit raising, or stock raising, or dairying, as the case may be; yet they feel a lack of knowledge and could take a few weeks of training with infinite profit. Where shall these men look if not to the Agricultural College? Arrange courses for them; instruct them in such form as they are able to take. There has been too little flexibiltiy about our colleges. We must try to diagnose each case, its needs, its limitations, and to fit our work to the requirements of the individual; not require all indivduals to fit themselves to our work and course.

After all, however, the great work of the college is its effect on agriculture as a profession. And this great work is most subtle in its processes, most difficult to describe or to prove. It is like the sunshine, noiseless, hidden in its processes; but take it away and the faded leaf, the spindling, unhealthy growths reveal its usefulness. Every profession has won its way to dignity, standing, the respect of mankind, through the application of science to its processes. As long as medicine remained an affair of the barber's skill and the old woman's mysterious spells and charms, it had no recognized place in the world's opinion. It was laughed at in health, feared and dreaded in sickness. With Harvey's discovery of the circulation of the blood, science came to the rescue. Medical schools were established, a recognized course of training gave dignity and standing to the physician, and medicine took its proper place among the world's learned professions. In our own day the normal school has been doing the same thing. From Wackford Squeers, of Dotheboys Hall to Thomas Arnold of Rugby; from Ichabod Crane to Horace Mann is a tremendous step in the current public estimate of the teacher. And this great advance has been brought about by the normal school idea, by the application of scientific methods and study to the processes of teaching. It is true that the number of actual normal school graduates is inconsiderable compared with the vast army of teachers employed in this broad land; but it is also true that of all the vast army not one remains entirely unaffected, uninfluenced by the change in the attitude of the public toward the profession of teaching. Our schools everywhere have felt the impulse and childhood is stronger, brighter, happier for it. And this change of attitude, this impulsion toward saner methods, healthier goals, a wider, surer, quicker development, is directly traceable to the normal school.

Thus it must be, and, indeed, already is, with agriculture. The world is beginning to know that there is a *science* of agriculture, that the man on the farm is not a mere beast of burden who has imitatively learned certain routine processes which are sometimes causelessly successful, sometimes causelessly not. The scientific spirit is beginning to permeate the whole body of farmers. They meet together in institutes to compare experiences, to reason from effect to cause, to conform future methods to past deductions. Every mail-bag that traverses the land bears bulletins from scientist to farmer, or letters of information and inquiry from farmer to scientist. Nay, the farmer is himself becoming a scientist. His eyes are open, he is observing, considering, comparing, experimenting, drawing conclusions. As never before, he is working his brains with his hands, and in just proportion his occupation is advancing to the dignity of a profession. His very vocabulary is changing and he now speaks of protein and carbohydrates instead of the light and the dark of the moon. And this same training in keenness of induction and deduction he is carrying into his relations with his fellowmen, and they are beginning to respect the strength of his logic and the shrewdness of his conclusions.

I am not claiming too much when I say that the Agricultural College stands for and explains this whole movement, and is true to its largest purpose in proportion to the thoroughness and success of its effort to infuse its scientific spirit into all agriculture.

FOOD ADULTERATIONS.

W. L. ROSSMAN, STATE ANALYST.

That the kind and quality of food exerts a marked influence on the health of the consumer, cannot be denied. There is nothing more intimately connected with good health, than pure food; and yet the health of the people, so far as the food consumed is concerned, has been in the hands of the manufacturer of food products and has been colored, coated, polished and drugged so long, that there is little left of that rugged health that characterized the consumer of natural food.

Your products are put upon the market as produced by nature, and are pure. The price you receive is controlled largely by competition with impure articles, or substitutes. The impure article is sold at the cost of production of the pure article, leaving, then, a handsome margin of profit for the adulterator; thus striking a double blow at you, who are both producer and consumer.

The importance of protecting the public against fraud in the manufacture and sale of articles of food, has been recognized in nearly every country of Europe, by the passage of stringent laws to prevent fraud and deception in the manufacture and sale of food products. In our own country, among the states having food laws, are New York, Pennsylvania, New Jersey, Ohio, Wisconsin, Minnesota and Michigan.

In this State, a law was passed as early as 1871, to prevent the sale of adulterated milk. From that time until 1893, laws were passed at nearly every session of the Legislature, regulating the sale of specific articles; but they were practically dead letters, as there was no one to see that they were enforced. In 1893 a law was passed providing for the appointment of a Dairy and Food Commissioner, but as there was appropriated only one thousand dollars for carrying on the work, the Commissioner was practically without means of enforcing the law.

It was not until 1895 that the general food law, under which the Department is now working, was passed.

THE EXTENT OF ADULTERATION.

Before taking up the work of the Dairy and Food Commission, I wish to call your attention to the extent to which the adulteration of food is practised. A reliable conservative estimate of the extent of adulteration is fifteen per cent. Upon this basis the people of Michigan spend, annually, over thirty million dollars for adulteration. It has also been estimated that the laboring classes spend sixty per cent of their total earnings for food. Thus it will be seen that the laboring classes spend nearly one-tenth of their total earnings for adulteration. This is quite a "leak" in the bucket of the laboring man.

Up to the present time the work of the Department has been largely educational. The law is broad and sweeping, and includes all articles intended to be used for food or drink. It was evident at the start that an understanding must be had with all manufacturers intending to sell goods in the State. The Commissioner appreciated the fact that the manufacturer is the fountain head and source of all evil, and that unless he could get control of the goods shipped into the State, he would have endless trouble in preventing the sale of adulterated goods.

The object of the law is protection to the consumer, and where this can be accomplished without prosecution we believe it should be done.

Manufacturers have shown, not only a willingness to obey the law, but have taken great pains to become familiar with its requirements; and have been to considerable expense in sending representatives to confer with the Commissioner in order that an understanding might be had in regard to doubtful points. Many of these firms at the time had goods in the State, either adulterated or improperly labeled. In the former case the goods were allowed to be withdrawn, while in the latter proper labels were substituted for the old ones.

It is evident that if suits were brought against all retailers having adulterated goods in stock, there is hardly a retail grocer in the State who would escape prosecution. This law, when thoroughly enforced, will simply revolutionize trade, and hence can not be applied at once without doing great injustice to those who are in no wise responsible for the conditions which made it necessary to enact the law.

THE METHODS UNDER THE PRESENT LAW.

Since the first of September three Inspectors have been busy instructing manufacturers, jobbers, and retailers in the State in regard to the requirements of the law, so that, when prosecutions are begun, it can be against those who have wilfully neglected to conform to its requirements. For example, a sample of mustard procured at a retail store and manufactured by a firm outside of the State, is analyzed and found to contain fifty per cent of wheat flour. There are, evidently, two modes of procedure open to the Department; one, the retailer is liable and could be prosecuted. There are perhaps a thousand other grocers in the State selling the same brand of goods, all equally liable with the first for selling adulterated goods. Prosecution of the one found would not aid the Department in detecting the thousand others who had them.

Second, in a case of this kind the policy of the Commissioner has been to inform the manufacturer that a sample of his goods has been analyzed and found adulterated, that such goods can not be sold in the State, and that if they are not withdrawn from the markets at once the seller will be prosecuted.

[Then followed extracts from letters showing the nature of many frauds, as well as the interest taken in the suppression of them by jobbers and retailers. They show that inferior goods are actually being withdrawn from the State, without attempts at prosecution.]

The effect on trade of the withdrawal of these goods is already being noticed in certain lines. The manager of a large cider vinegar factory stated, that when he bought his stock of apples last fall, not knowing what effect the law would have on trade, he purchased only his usual supply. In a short time he found that he had greatly misjudged, and that he would be unable to supply his customers. He said he would use several times as many apples next year as he had used before.

That the public may be not only protected from fraud but enlightened on the subject of food adulteration, the Department is required to issue, monthly, bulletins containing the rulings of the Commissioner, results of the analyses, and such other information as the Commissioner may deem of interest to the public.

These bulletins are sent to all the newspapers in the State, and to all who request them, so far as the number printed will allow.

THE KINDS OF ADULTERATIONS.

There is scarcely an article of food consumed by the American people, but what is subject to adulteration in some form. From the cheapest to the most expensive articles of diet, we find the art of the adulterator exhibited in so skillful a manner as to almost defy detection.

When corn jelly ceases to be sold for currant, cottonseed oil for lard, and glucose for cane syrup, there will be a gradual readjustment of prices more satisfactory to all concerned, except the adulterator.

The claim that the demand for a cheap article on the part of the consumer is the cause of adulteration is false. Adulterated goods are always represented as pure, and in nine cases out of ten, if the consumer were informed that a certain article was adulterated, he would prefer paying a little higher price, if necessary, in order to secure pure goods. There is abundant evidence to prove that it is the demand of the manufacturer or retailer for illegitimate profit, which is the cause of this nefarious practice.

A barrel of syrup, purchased by a retail grocer in Lansing for absolutely pure cane syrup and so billed to him, proved on analysis to contain ninety per cent glucose and ten per cent cane syrup. A sample of adulterated pepper, bought for six and one-half cents, was retailed at forty cents per pound. In the former case the manufacturer, and in the latter the retailer, profits by the adulteration. Numerous instances of this kind might be cited, but in no case do we find the consumer benefited by adulteration.

The materials used as adulterants are largely inert substances having no food value, and are added simply to increase the weight or size of the package. That substance is considered most suitable for use as an adulterant, which approaches the nearest in appearance to the genuine article, and which is as heavy if it is to be sold by the pound, or which is as light if it is to be sold by the package.

Right here I wish to state that by means of the package trade during the last few years, the manufacturer has been enabled to palm off more adulterated goods than by any other means. It is very rare to find a "Fancy package" containing exactly what the consumer bought it for. When the consumer buys green coffee and roasts it himself, or his spices whole and does his own grinding, there is little chance for fraud. The simple fact that he buys the coffee, pepper, cloves, etc., for less in the ground than in the unground condition, is sufficient evidence that it is adulterated.

The manufacturer gives no thought as to the effect of the substances added upon the health of the consumer. The adulterants used in our most common food products may be summarized as follows:

In butter—Oleomargarine, cotton seed oil, beef and mutton suet, lard and water.

In cream of tartar—Acid phosphate of lime (super phosphate), alum, gypsum and starch.

In black pepper—Buckwheat, corn, wheat, rice, mustard hulls, rice hulls, pepper hulls, sago, Cayenne pepper, cocoanut shells, and olive stones.

In cheese—Skim milk, lard, cotton seed oil, and oleomargarine.

In ground coffee—Chicory, peas, beans, wheat, corn, rye, acorns, burnt sugar, and peanut hulls.

In coffee berries—Artificial berries.

In canned goods—Sulphate of copper to give a green color.

In cocoa and chocolate—Rice, wheat and corn starch, gluten, iron rust and various other coloring materials.

In ginger—Cayenne pepper, mustard hulls, wheat flour, gypsum and exhausted ginger.

In honey—Glucose and cane syrup.

In jams and jelly—Glucose, dextrine, starch, coloring material and artificial essences.

In lard—Cotton seed oil, beef and mutton stearin. No article has been more shamefully adulterated.

In mustard—Wheat flour, rice flour, gypsum, Cayenne pepper and various coloring matter as chrome yellow, Martius yellow, and turmeric.

In molasses—Glucose and tin salts.

In milk—Skim milk, water and preservatives often injurious to health, especially when taken daily by children and invalids.

In olive oil.—Refuse seed, peanut, and other vegetable oils.

In spices—Refuse material of every description.

In general it may be stated that the food laws of the various states where there is sufficient appropriation to enforce them are saving the people many times the amount expended; while the states having no law become the dumping ground for all sorts of cast off material.

The great obstacle to pure food legislation in this country is the large sums of money used by the unscrupulous manufacturers in lobbying against bills of this kind.

The next session of the Legislature in this State will not be materially different from the last in this respect. Every effort will be made to defeat any bill tending to restrict the manufacture and sale of adulterated foods. There is money in it, and the manufacturer consequently has money to spend, in order that he may continue to gull the public. On the contrary the people who favor such legislation have only honest effort to promote the passage of honest laws. Public sentiment should be so strong at the next session of the Legislature that a representative of the people, voting against a bill whose object is protection of the people against fraud, may be known to be in league with the pocket book of the unprincipled sophisticator of human food.

HORTICULTURAL DAY.

WEDNESDAY MORNING, FEBRUARY 12.

A letter from Mr. Geo. B. Horton, Master of the State Grange, who was to preside at the Institute, stated that it would be impossible for him to be present. This day being Horticultural Day, Prof. Taft, of the Agricultural College, was called to the chair.

CULTIVATION AND CARE OF PEACHES.

MR. ROLAND MORRILL, BENTON HARBOR.

Before beginning on my subject, I would like to spend about one minute on something which has been forcibly impressed upon me within the last month, that is that farmers are a little slow in getting acquainted with the business at hand. They don't take up the topic as readily as they would like to, not through indifference, but many are a little diffident, bashful. That ought not to be the case, but it is. I saw an illustration of that at the Long Institute last week. At the close of the session, after a four days' meeting, everyone was ready to do or say something. They wanted to go into detail. The complaint was that the whole thing had been too short. But the first day they didn't warm up.

What I can say to you is simply outline, but what the people are looking for are the details, the little things, and they can only be brought out by a thorough discussion of any topic.

[A series of lectures by Mr. Morrill on "The Peach," delivered at the Long Institute at South Haven, includes this lecture on the "Cultivation and Care of Peaches," and will be found in subsequent pages. See index for exact page. We here include, however, the discussion on the subject at Grand Rapids.—K. L. B.]

DISCUSSION.

LED BY C. J. MONROE, SOUTH HAVEN.

Mr. Monroe: Mr. Morrill has taken up this matter of cultivation and care, and has brought it down, in a systematic way, to the marketing, which is the next item on our program. Now I am satisfied that it will be a good deal more valuable to this audience—if any one differs from Mr. Morrill on cultivation, trimming, thinning—to take that up and use the little time we have in that way, rather than for me to undertake to add anything to what he has said, and I know that I shall serve this audience best by allowing the questions to be asked.

The Chairman: We shall be glad to hear the questions or experiences of anyone here present, confining yourself to the matter of the cultivation and care of peaches.

Q: Mr. Morrill, do you use the Universal weeder, or what?

Mr. Morrill: I used the Ward weeder last year, but I bought some Breed's weeders for this year.

Q: Will the latter work in small loose stones?

Mr. Morrill: Couldn't tell you, haven't got them.

Mr. ————: I have a small peach orchard in the town of Sparta, and as near as I can ascertain from seeing other peaches, they are the Wheatland variety, and for four or five years they had no appearance of bearing at all and I neglected them. This last spring everything was favorable, and I bought a new steel cultivator, and cultivated the orchard. The trees started, and after a snow I saw another chance, and gave it another thorough cultivating without plowing; I fertilized with ashes and so on, and the consequence was that I had a tremendous growth. I never saw trees grow better in my life. Those trees bore two crops. We had first a tremendous crop of large peaches, and a month from that there were others as big as walnuts that grew and matured after the first crop.

Mr. Morrill: I can now see how my Wheatlands may get even with me; they haven't done anything for eight years; perhaps they will bear two crops a year.

Mr. Whitmeyer: I understand you do not recommend deep plowing. Now I would plow deep the first year. Also in regard to heading our peach trees. It is a question whether it is not policy to do so, as we are after dollars and cents. Of course we like a nice orchard, but we can raise a nice orchard by real low pruning. Mr. Hale gave me some ideas about starting an orchard. When I started, I left my trunks 2½ feet. The next year I started another orchard, and headed it lower, and last year I started another orchard, and let them start from the ground. Mr. Hale says that in this way you will get better peaches, because they will get the sap right from the root. I am going to try it anyway.

Mr. Wilson: I tried an experiment some fifteen years ago, when the common custom was to trim the trees up high, so you could get your horse under. I plowed and cultivated thoroughly and just about killed my orchard, and the trees bent over and were sun scorched and pretty nearly killed.

The Chairman: Mr. Wilson believes in low heading and shallow plowing.

Mr. Keyes: Shall we, who have only clay land, be kept from trying to raise a few peaches? It has been suggested that dry sandy land was the proper soil; but several years ago we commenced raising peaches on clay. We have very thrifty trees and promising peaches.

The Chairman: I think Mr. Morrill gave what he thought was the ideal location.

Mr. Morrill: I think Mr. Whitmeyer must have been discussing something else at the time I had my paper. I might have gone further into detail, but I did not have the time. You can only determine the value and application of these things by knowing your own land. I have found what my land wants. I have two different farms; what I use on one does not do me any good on the other.

As far as concerns this gentleman who is feeling it unfortunate that he has clay, I have seen good peaches on clay—a certain character of clay will produce fine peaches, but I read Mr. Hale's "Ten Commandments" in which he suggests the ideal conditions, and in my observation, that is the ideal location—sandy loam.

Mr. Keyes: The clay is naturally well drained, but I have had to put in other crops to restrict the growth.

Mr. Craft: I started an orchard last spring on clay. Would it be a good plan in August to sow rye to plow under next spring?

Mr. Morrill: I would have no objections to sowing rye if it was plowed in the next spring, but if it was neglected, I would have serious objections. I have had some experience in this and made serious mistakes, and the great trouble with rye is allowing it to grow too late. If your orchard is in bearing it takes the moisture out of the ground and the orchard feels the full effect of the drouth, and that is often a serious mistake. I don't take much stock in the fertility being replaced in the ground by crops of rye, as some people do, because I haven't seen the results from it that I expected.

Mr. —————: I have heard it reported that farmers had tried it.

Mr. Morrill: Yes, there is lots of it going on and plenty of people like it; it is a good winter covering.

Q: Is it a good plan to sow it in the fall—about August?

Mr. Morrill: Yes, but I will tell you what I am going to do. I am going to sow oats. It will make a bigger growth, it will hold the leaves where they fall (and that is very important, I believe), and the oats will be dead in the spring, and won't draw on the land. They can be turned under with a small plow and it is not necessary to plow deep.

Mr. Stearns: The gentleman who spoke of his clay soil says that he has good drainage and says that he can get as large peaches on clay as on sandy loam. I have both, and find that I get better size on sandy soil.

Mr. Conrad: I would like to ask if Mr. Morrill cultivates peach trees while they are in bloom?

Mr. Morrill: I do not. There is an old notion among us, that it is as well to leave trees alone during the period of pollination, and I have always followed that plan, without knowing really why. I simply have followed on old idea.

I want to say one more thing, while I am up, regarding something I forgot to mention. In this trimming business I believe it is essential to do it before the period of pollination. I believe that is a severe draft on a tree and the work should be driven along, so that it is completed before the bloom opens. It is the same as doing the pruning before the pit forms.

Q: Would you wait until after the blossom before doing any cultivation?

Mr. Morrill: In future I think I shall start before that, providing the weather is right. Often a man will go on and stir up his land just before a freeze, and suffer very badly from doing so.

The Chairman: I will announce the committee on credentials of delegates to this meeting from the various agricultural societies: Hon. Robert D. Graham, Mr. L. J. Post and Mr. Farnham.

MARKETING OF PEACHES.

HON. ROBERT D. GRAHAM, GRAND RAPIDS.

During the last few years much has been said and written upon the planting, care, and growing of peach orchards, while the question of marketing has received little attention, not from a lack of care on the part of the grower, but because there has always been a ready market for all our product at fairly satisfactory prices near at hand. But conditions are changing. The low and unsatisfactory prices obtainable for nearly all farm products, coupled, perhaps, with the large stories told of the great profits in peach growing, have stimulated the planting of a very great number of trees, and our production of this fruit will soon be out of all proportion to the demand, in the territory heretofore tributary to our orchards. It behooves us as growers and shippers to cast about for an extension of our markets. This brings in the all important question of transportation and freight and express tariffs, for it has been demonstrated time and again that we can put our peaches into almost any market in the United States and Canada, providing rates can be procured which will warrant the shipments.

A somewhat superficial, though I think a very conservative estimate, discloses the fact that during the past season Michigan shipped to points beyond her borders, in the neighborhood of 2,500,000 bushels of peaches. This vast amount of fruit was distributed largely in the States of Illinois, Wisconsin, Indiana, Ohio, Minnesota, New York and the Province of Ontario. In the latter place we are finding a good and constantly growing market, notwithstanding the duty of 50 cents per bushel imposed by the Canadian government on imported peaches. This duty, however, costs the Michigan grower just 50 cents per bushel on all fruit shipped, and very seriously curtails the shipment of the poorer grades as the prices obtainable for them will not more than cover expenses.

TRANSPORTATION.

For a long while the various American railway traffic associations have discriminated against our Michigan baskets, or rather against all baskets, and have charged one first class rate and a half for peaches in baskets, while peaches in crates were carried for one first class rate. Two years ago, through the efforts of our local railway people and the Grand Rapids Fruit Growers' Association working together, the Central Traffic Association were made to see the injustice of this discrimination, and since then they have given us a one second class rate on peaches, which is about one-half what we had formerly paid. By this reduction we have been enabled to place our peaches in every considerable market within the jurisdiction of the Central Traffic Association, with a fair margin of profit for grower and shipper. I am not familiar with the exact limits of this territory, but it extends as far east as Buffalo and south to the Ohio river.

Beyond these limits the old schedule of tariffs still holds and the rates are so high that we are practically shut out from such markets as the cities named below. These cities are all outside the limit of the Central Traffic Association, while the rates to Buffalo, which is within the limit, are 36 cents per hundred. These figures are for car lots.

For the purposes of comparison I have prepared the following table. The first figures given represent the rate now charged by the Eastern Association; the second the rates we desire, the same as charged by the Central Association, or a second class rate.

				Amt.	Difference.
1.	New York,	1.08,	20,000 pounds to car	$216.00	
2.	“ “	.62½,	“ “ “ “	125.00	$91.00
1.	Philadelphia,	1.05,	“ “ “ “	210.00	
2.	“	.60½,	“ “ “ “	121.00	89.00
1.	Rochester,	.81½,	“ “ “ “	160.50	
2.	“	.46,	“ “ “ “	92.00	68.50
1.	Syracuse,	.81½,	“ “ “ “	162.50	
2.	“	.50,	“ “ “ “	100.00	62.50
1.	Utica,	.97½,	“ “ “ “	195.00	
2.	“	.56.	“ “ “ “	112.00	83.00
1.	Albany,	1.03½,	“ “ “ “	207.00	
2.	“	.60,	“ “ “ “	120.00	87.00
1.	Boston,	1.18½,	“ “ “ “	237.00	
2.	“	.68½,	“ “ “ “	137.00	100.00

These rates are from Grand Rapids.

Of course the cities first named are somewhat more distant than Buffalo, but after reaching that point the rates nearly double.

There is not the least reason in the world for this discrimination, as plums, quinces, cherries, oranges and lemons are rated as second class, while bananas are rated third class and have a still lower tariff. At the same time many of these fruits are selling for a higher price than peaches and there is not the least difficulty in getting the minimum amount into a car, namely, 20,000 lbs., or 400 bushels. A very little figuring shows what an immense difference there is between these rates. Suppose, for instance, that the whole Michigan product were to be shipped to Boston where there is just $100.00 difference in rates per car, 2,500,000 bushels would make 6,250 cars; this at $100.00 per car means $625,000; but this does not represent that much loss to the railroads, for at the present rate we cannot put our peaches in that market to any extent.

These statements will naturally call forth two questions, viz., if rates are lower on peaches in crates why not use them? Second, you succeeded in getting a reduction from the Central Association, why not from the Eastern as well? In answer to the first, every country or section has a particular style of package. Thus, California has her box, Georgia the six basket crate, New Jersey and Delaware the tall straight basket, and Michigan the Climax 1-5 and 1-2 bushel baskets, and the standard bushel basket almost universally used in this section. And to each state or section the package or basket becomes a sort of trade-mark, which is of great value, and it would be almost if not quite impossible to induce the growers and shippers to abandon their use. As to the second point, a reduction of rates in the Eastern district would not only let our peaches in their markets but it would at the same time open up our markets to the New Jersey, Delaware and Maryland product, and it is a serious question as to which is better. I am inclined to believe that the quality of the Michigan product will enable it to successfully compete with eastern fruit in any market, and that it would be to our advantage to extend our market as far as possible eastward, but in order to do this successfully the Michigan grower must adopt better methods of packing and grading; in fact, our slipshod way of marketing peaches without grading as to size has already done us much harm in the eastern market, and only the splendid quality and flavor of our fruit has saved us.

METHODS OF MARKETING.

Now on the methods or systems of marketing fruit, there is so much to be said that I hardly know where to begin. The one most popular perhaps throughout the State is by consignment; in fact, until recently and even now outside of Kent county this has been almost the universal way in which peaches were marketed, and the system, while having some advantages, has taken a great deal of money out of the State which should have stayed here, has made a great many rascals wealthy, and in effect put a premium on dishonesty. On the other hand this system gives the grower the least possible trouble. All he has to do is to pack up his fruit and put it aboard the cars or boat, and in a day or two he gets his *returns* and what money his consignee may see fit to send him. The grower is not bothered with making bargains, looking up markets, keeping accounts or any thing of the kind. Besides there is that element of uncertainty about it that appeals so strongly to the average mind. Be that as it may, after once getting into the habit or custom of consigning it is a very hard matter to stop. Then again by this system fruit is more widely distributed than in any other way. Commission men will take greater chances on goods belonging to another than any one would with his own property, often receiving good prices and establishing new markets. But taking all things into consideration I am inclined to think that the whole principle is wrong and that he who gets the profits should take the risks. In a small way much fruit is disposed of by billing out direct to consumers or retailers. While this method gives very good satisfaction to an occasional grower it does not meet the general want. There has here in Kent county grown up a system peculiarly our own. Our fruit is practically put up at auction and sold to the highest bidder. By a system of advertising we have been enabled to induce buyers to come to our city getting supplies in the open market for various towns and cities both in and outside of this State. We have besides a number of resident buyers who handle large quantities of fruit, some of which is distributed to their regular trade all over the country, but much more is shipped in car lots to the larger cities where most of them have agents. This system has many advantages to all concerned. Outside buyers come to our market and get just what they want both as to quality and quantity each day. They have put their money into the fruit and will use every effort to maintain prices in outside markets. The jobber who buys several thousand bushels of fruit each day can handle it to much better advantage than a small dealer or the average grower, being in constant telegraphic communication with all markets tributary to Michigan; and having trusted agents in many, he is not restricted to any one or a dozen, but if the market is "off" in one place he is sure to find it good somewhere else. While it is undoubtedly true that some, and perhaps all our buyers have been making large margins of profit in handling peaches in car lots, still I believe it is generally conceded that our growers have realized more clear money out of their peach crop than the growers of other sections, from the same amounts under the system of consigning, and that the prices received have usually been satisfactory. When it becomes evident that we are not getting what the outside market would warrant buyers to pay, the growers of this section will not be slow in pooling their product and handling the lot through one or more agencies. This system undoubtedly has merit, but as it is still an experiment I will not touch further upon it at this time but await further developments.

DISCUSSION.

LED BY CHAS. A. SESSIONS, SHELBY.

Mr. Morrill has told you how you can successfully grow an orchard, but for me or any other person to tell you how to market it is impossible. I can suggest plans, and advise ways and means, but there are second and third parties to be consulted. First, the transportation company—they must have their share, whether you have anything or not; second, there is the commission man—it is necessary to transport our peaches to distant markets. We have outgrown the markets within a radius of 200 miles. We must get them to distant points in carload lots, and the sooner the transportation companies realize this fact and provide ways and means of transportation, the better. We want thoroughly ventilated cars, and for any point beyond a short distance, ice cars, which shall be especially designed to meet the requirements of the peach trade.

The packages I believe should be changed somewhat. Take the ordinary Climax basket, which has sloping sides; my idea is that it would be better to have baskets with perpendicular sides or boxes. They would pack more conveniently and ride better in the car.

In comparing those who have sold their crop in the home market, where there were buyers, with those who have made a practice of consigning to commission men, I believe the average grower who sells his peaches at home realizes more money and with less trouble than the grower who ships and consigns to the average commission man.

Now then, in order to induce buyers to come to points outside of large places like Grand Rapids, the transportation companies must agree to furnish cars at proper times and in sufficient quantities and properly constructed. For short distances, they must be thoroughly self-ventilated or capable of being iced. They must increase the time made, they must attach these cars to passenger or fast freight trains, or if the quantity is sufficient, have fast freight trains that make equal time to the passenger trains. Let the buyers know that if they put up their money into this fruit they will be carried the distance rapidly, and if you can get the buyers where the fruit is, you can get them to take the whole product. I believe the average grower had better stay at home and let someone else do the marketing. In the end, he will be the gainer.

Mr. J. N. Stearns: I once received a letter from a commission man who had been in the business twenty-five years in New York, saying that the demand for a fancy article of fruit was three-quarters, with a supply of one-quarter. I think in that may be found a partial solution at least, of the problem of marketing fruit. We are not careful enough in making our fruit of that fancy grade.

I heard the question asked two or three times this morning on the train, in regard to the prices Mr. Morrill has received in Chicago. I have seen his returns. I know he is able to get better prices than many of us who ship to Chicago and I would like to have him explain to this audience the arrangement he has with his commission man, and the mode of packing he employs in order to obtain these prices.

Mr. Morrill: There never has been any regular organized conspiracy in the matter at all, that I recollect of. The mode of packing that has brought it about has simply appeared to be that dictated by ordinary good sense and has been the result of a good many years of hard work on my part, and I guess on the commission man's part too. I have simply packed what I have had so that it was as good as it appeared to be—nothing more or less; simply making every package as good at the bottom as at the top, in some cases perhaps better. I think that is the best way to trap a man's pocket book; it is a surprise. He goes again, to be surprised again. He may not be surprised again, but he will get as good all the way through as he buys. These are just the little simple methods that would suggest themselves to any one.

Q: I want to put the question a little differently. I understood, in order to attract the attention of purchasers, that for a first class article you used a special basket which would attract attention, so that the person buying could know that he was getting something he could rely on.

Mr. Morrill: That is a fact. I always keep my flag in sight and my name on the flag, so that people may know that I am in town. For selects I have used a crate that is used for another purpose, the ordinary four basket, tomato crate. Each basket holds five lbs. and I put my selects in that and I have had prices that would not be believed by the majority. This last year, some of my neighbors have commenced packing inferior fruit in that same package, and in order to get color on it, they use tarleton. I may have to scurry around and get some other method, but ordinarily it is better simply to aim to have it as good as it appears, and make it as good as you know how. You cannot market poor fruit at good prices. You cannot cover the poor up with good, and deceive anybody. The buyer in the big cities who makes it his daily work to buy fruit, knows the moment he looks at a package whether it is sound or not, because the man who does that leaves his earmarks on the outside.

One commission house has handled my stuff for eight or ten years. I depend upon one house and everything that goes to them, even my low grade fruit, is guaranteed to this extent, that it shall be exactly as good as it appears, clear down through. Of course, delays in transportation or anything of that kind, no one will hold you responsible for. It is guaranteed to the extent, however, that if any customer finds that it is not as good clear through as on the top, he can return it and take his money. That of course throws the risk back on me, but I know what I have to meet, and I have not had to return any money that I know of. But, gentlemen, when you do that, you have got to have pretty good control of your business. You have got to be on the job yourself and you have got to watch your packers. You have a good deal to do, and you will have to be pretty numerous, but it can be done.

I would like to say a word about Grand Rapids. Mr. Graham can talk to you about that. Grand Rapids is clear in the front on marketing fruit at home. A handful of men here have worked out the problem as to how to market fruit at home and that is the ideal form of marketing. Mr. Graham and Mr. Sessions and Mr. Munson have been identified with it. Mr. Garfield knows it from A to Z, and if I make no mistake, the business men begin to see the advantage of it and are trying to assist these men, and if they keep on, they will make for Grand Rapids with peaches what they have made it in furniture—the best market city on earth; and it would not be any surprise to me to see spent in this town from half a million to a million dollars per annum, for peaches distributed here, and that inside of five years.

Mr. Pierce: Mr. Rapp, one of our heaviest jobbers, is here with us, and we would be glad to hear from him.

Mr. Rapp: Of my experience in the marketing of peaches, I would say to you that I don't think any of you would have any trouble in selling all the peaches you can grow, if you put them up in the right shape. It will be but a few years before we will have the greatest peach growing district under the sun, and in order to market the crop to advantage you must establish a reputation of putting up good fruit. When you do that you will have no trouble to sell all you can grow. Let every grower use a stencil with his name with a letter A for No. 1, B for No. 2, C for culls. You will get more money for your fruit, and no matter how large a crop you have you will find a market for all at good price. There is no risk in shipping good stock a good long distance. It is the peaches that drop on the ground and the culls that cause the trouble. In picking peaches there are more or less that drop off. It is hard work for some growers to let them lie. They look all right, and they will put them in with the picked fruit. That is all wrong; put them in a basket by themselves, mark the basket and sell to some one for present use. You can most always get their full value. There is no money lost in shipping good stock, it is the poor stock mixed with the good that makes the loss.

ESTIMATE OF PEACHES SHIPPED IN 1895 FROM THE FOLLOWING COUNTIES:

	Rank.	Bushels.
Allegan County	1	1,250,000
Kent "	2	695,000
Oceana "	3	250,000
Mason "	4	150,000
Ionia "	5	60,000
Van Buren "	6	20,000
Barry "	7	15,000
Total amount		2,440,000

This is 6,110 car loads of 400 bushels each in less than five years. This amount will be doubled soon. I think that at least 1-6 of all our peaches would go into the territory that is east of Buffalo if we could get the same rate on baskets as on crates.

Mr. Rice: Our Canadian friends have made some experiments in long shipment of fruit. Grapes and tomatoes have been shipped to England, there to come into competition with grapes from Southern France, Spain, and the Jersey Islands. They have also sent apples to British Columbia. One shipment was made to the antipodes, as an experiment, New South Wales being selected. The apples were wrapped in paper and put in one bushel boxes. In passing through the tropics many of them were baked, but those that passed through safely brought $2.50 per bushel.

PEACHES IN THE INTERIOR OF THE STATE.

H. P. GLADDEN, AGRICULTURAL COLLEGE.

The famous "peach belt" of Michigan extends along the western lake shore from the southern boundary of the State to Traverse Bay. Within this territory is a large area where the peach can be grown to a perfection equaled by few, if any, sections of our country. But there are other portions of the State where the peach has been grown successfully, and doubtless investigation would show that there are many yet undiscovered localities where this fruit could profitably be grown.

In looking for a site adapted to growing the peach what are some of the points to have in mind when making the selection? Experience has shown that an elevated spot is quite necessary. By an elevation is not meant so much the height above sea level, though this may have some bearing, as its elevation in relation to the immediately surrounding country. It is surprising what a difference a few feet in height above the land around it will make in temperature during a cold snap or when a late spring or early fall frost is expected. The College peach orchard is on land almost level with that around it. Some years we have a partial crop of fruit but it is the exception when we do. Three miles from the College is a portion of land quite limited in area which is perhaps a hundred or more feet above the land around it. During a cold spell the thermometer there is ten degrees higher than at the College, and when strawberry blossoms in the spring or tomato plants in the fall in the College garden are killed by frosts, plants of the same kind on that hill are uninjured. Also on that high portion peaches have been grown for thirty years, though in some seasons but a partial crop was gathered. If this hill were a plateau several miles in extent, doubtless it would not escape the sudden drops in temperature or the frosts that make fruit crops uncertain on the lands adjoining. It is because of its small area that this hill is valuable for peach growing.

Peaches will stand from 10 to 20 degrees below zero, differing with varieties and with the condition the trees enter the winter, without serious injury. Five degrees lower temperature would be fatal to the crop. Four out of five winters the hill orchard does not get this fall of five degrees; the College orchard does. Hence the principal reason why one locality is more favorable than the other for the peach. If the high land is cut up with ravines, I think its adaptability to the peach would be improved. A railroad cut fifty feet deep runs from southwest to northeast right through the land above mentioned. The peach orchards are on both sides and close to this cut. I believe another reason why these orchards have been so successful is due to provision thus artificially made for the cold air to pass through in this big ditch.

SELECTING THE SITE.

In the interior of the State the exposure may have something to do in the selection of the site. Possibly a southern exposure may hasten the growth in the spring and so bring out the blossoms to be injured by the frosts. If an orchard has an eastern exposure and the sun comes out early and bright after a late spring frost, the blossoms are more apt to be injured than they would be if allowed to thaw out slowly; this a western or a northern exposure would enable them to do. I should be inclined, other things being equal, to select a site having a northern or northwestern exposure. How much there is in this question of exposure I am unable to state.

The soil of the peach belt is generally sandy, quite light in some portions. From this fact has probably risen the prevalent notion that only sandy lands are adapted to peach growing. Some of the most successful interior orchards I know of are on clay, and heavy clay at that. Soil of a clayey nature may even have some advantages over sand for peaches. Clay is a stronger soil and the trees will bear a larger crop without injuring them and the trees are longer lived. Possibly there may be a difference in early maturity, in color, or in quality in favor of one of these soils. The growers in the peach belt are near the lake ports or they have facilities for cheap shipment by rail to the big city markets. These advantages most of the interior orchardists cannot have and though the site may be all that is desired in other ways its nearness to some market is a very important point. It is surprising what a large amount of fruit a small place can be made to take if it be put before the people in the proper shape. If the market place be a small one, do not commence on a large scale. The aim of the peach grower around the interior towns should be to create a demand by growing the best fruit possible, put it before the people in the best shape he can, and then keep a little ahead of the demand.

THERE ARE SOME ADVANTAGES

The peach grower in the interior has over the big grower on the lake shore. Although his market may not be so large, yet for a limited amount of fruit, it is a better one. The prices may not go so high as they sometimes do in the large markets, but they do not go so low, and take it through the season better rates will be received. His fruit does not have so far to go to market and can be left on the trees until fully ripe and then when taken to town is fresher and looks better than peaches shipped from a distance. We can always sell our peaches on the Lansing market for from 20 cents to 50 cents more per bushel than the shipped peaches will bring. People come from the city and surrounding country in buggies and wagons and take all the lower grades and culls, and but little fruit is wasted. We have no freight or express to pay, which is quite an item.

The care and cultivation of an orchard in the interior of the State should differ but little from that given one on the lake shore. Possibly our orchards do not need so close pruning or as much thinning of fruit. An occasional low drop in temperature or a late frost gives the trees a resting spell, and they can bear larger crops when they do have them. In the selection of varieties the interior grower should aim to have a complete succession of fruit from the earliest to the latest, and so keep his market supplied. I am sure that there are very many sections in the interior of the State of more or less area well suited to the growing of the peach, and that that industry could profitably be increased.

DISCUSSION.

LED BY H. O. BRAMIN, GRAND RAPIDS.

What are the prospects of the fruit growers of today compared with the past? The commercial fruit grower has had many disadvantages to contend with. He had to understand what constituted a first class location, and the varieties that would succeed in his particular locality. He had not those advantages at hand to fight the insects and diseases that we have today, consequently had to try experiments at a great loss of time and means. In regard to cultivation, we have implements that will do the same amount of work in much less time and more satisfactory. The fruit grower of today has all of the advantages of the horticultural societies and the Experiment Stations, bulletins from the Agricultural College treating upon all subjects pertaining to horticulture, at his hand free of charge.

The fruit grower of today finds that fruit growing is not an experiment but an established industry. He has information at hand to select varieties from, suited to his particular locality and soils. The package factories are giving us more sizable and smoother packages for less money than formerly and hope to see more improvement in that line in the future. We have better shipping facilities at present than formerly, trains run on faster time, full cars with open packages giving the commission houses the advantage of moving the crop faster and arriving at its destination in better condition.

Some will ask, what are the prospects of fruit growing in the future? is it not being overdone? We find that the commercial fruit growers had the same question to answer in the first ten years of experience the fruit grower had in this State. We can only judge of the future by the past, we know that we are setting five trees today where we set one five years ago, with a larger per cent to set the coming spring. The profits of fruit growing in the future depend largely on the amount of brain work that is put into the business. The business must be carefully attended to in all of its details.

Plow deep first, fit your ground well, set early and a little deeper than the tree was raised in the nursery. I think it will do to plant corn or some home crop on the ground the first year's setting, after that should prefer letting the trees have their full swing. Cultivate often until the first of or not later than the middle of July.

It would be well before pruning to go to some of the leading fruit orchards, examine their new orchards, see if the heads are started two and one-half or three feet from the ground, well headed in and thinned out, giving a chance for fruiting near the body of the tree, or whether they are trimmed in the old slipshod way of simply cutting out the dead wood. The same will apply to the plum and pear.

Q: I think it might be well to secure, and I would ask these gentlemen to give us, a few of the varieties that they know to be more hardy than others, that we may know what to use in the interior of the State; we are not in the belt, though this year we got a large crop. But we would like to get something in there that we can have choice fruit from.

Mr. Morrill: I can give what my experience has shown to be good. I would not commence with any of the early varieties, although they are hardy. I would commence with the Lewis or Early Michigan, which are practically identical. The Lewis or Lewis Seedling or Early Michigan—either one. You want strictly hardy varieties. Then there would be a little break there. The Old Barnard is quite hardy, then comes the Kalamazoo, a Michigan production, and Snow's Orange. There is the Gold Drop, the Crosby, and the Elberta, which latter is perhaps not quite as hardy; my opinion is that it is not. There is a new peach coming out, the Fitzgerald, which will probably prove to be all right. There are numerous other varieties just below these.

Mr. C. S. Bartlett: I want to ask of these gentlemen, if they think that in the interior of Michigan, where we are not so protected as along the peach belt, whether it is advisable in the spring of the year or the last of winter, to mulch the trees, with the expectation of holding back the bud.

Mr. Bramin: It is a very good idea, though I never practiced it on my place; I have noticed that with maples and other trees when I mulched them, it held them back.

Prof. Taft: So far as the mere blossom is concerned, you can perhaps make a little difference, but not to any extent. As it grows warm, experiments show that they will blossom, whether or no. You can certainly make a slight difference, but not enough to pay.

Q: We are about to set a peach orchard, and we propose if possible, to set it with an old apple orchard. What do you think about it?

Prof. Taft: I wouldn't do it.

Mr. Morrill: I would set the apples in one field and the peaches in another.

The Chairman at this point asked Mrs. Mary A. Mayo to explain the intent of the Woman's Section.

Mrs. Mayo: Mr. Morrill gives you an idea here; he says your baskets of peaches should be what they appear to be on the top. What is the reason they have not been? It is because the men are not honest. I heard one of the professors of the Agricultural College say that when they go to examine the boys who apply for admission to the College, they examine them as to their studies—but he said; "after those boys have been in the College two weeks, I can take them, one by one, and tell you what kind of a man the father is—whether he is an honest man, a clean man; and I will tell you what kind of a woman the mother is, because that boy is bearing about an exact photograph of the father and the mother and the home."

Now I tell you that the fathers and the mothers and the homes have not been honest ones, if the majority of the men in the State of Michigan are putting an inferior grade of peaches on the bottom of their baskets, and at this convention that we are to have, we want to talk about how to make these boys, clean, pure boys, and of the girls, strong, staunch women, who in turn shall rear clean, pure men, so that in future meetings you won't have to talk about making the bottom of the basket as good as the top.

I think the men ought to talk these things over too, because I believe God designed a man for fatherhood as much as he designed a woman for motherhood. They shirk their duties many times, and lay all the blame on the woman's shoulders, and I believe that this subject ought to be discussed by the men as well as the women.

BEES AND HORTICULTURE.

BY PROF. WALTER B. BARROWS, AGRICULTURAL COLLEGE.

[On account of illness Prof. Barrows was unable to be present, but we have secured from him an abstract of the lecture he was to give.]

The importance of bees to the horticulturist is not limited to the value of the honey which they make; it even might be profitable to keep bees without ever securing a pound of honey. For, without the visits of insects many blossoms never would set any fruit, and since bees are by far the most valuable of all insects for this service, it is of the utmost importance to the fruit grower and gardener that an abundance of bees should be within easy reach of his orchards and gardens. Bees visit flowers to gather food, and this food may be either nectar or pollen; but, whether one or the other is sought, the bee is sure to get more or less pollen dusted over his hairy head, body, and legs, and to brush more or less of it into the flowers which it afterwards visits. This pollen, borne in the flower's stamens, is the fecundating or male powder of the flower, and when dusted upon the receptive pistil, the female part of the flower, the latter is said to be fertilized or *pollinated*, and the process is known as *pollination*. In some flowers both stamens and pistils grow near each other, and the pollen at the proper time is shed directly upon the receptive pistil and perfect seed or fruit results. Such flowers are called perfect and *self-fertile*; such, for example, are the flowers of the quince. They are practically independent of the visits of insects. In other cases only stamens may be produced in one flower and only pistils in another, and some outside help, often from the wind or from some insect, is needed to transfer the pollen from one flower to the other or no fruit will result. Some varieties of strawberries bear such imperfect flowers, and many a gardener has suffered serious loss because he did not understand this fact. But some plants and trees, notably some varieties of pears and apples, bear flowers which contain both stamens and pistils, and the stamens produce plenty of pollen, yet often these trees set no fruit. Such flowers probably are *self-sterile*, that is, their pollen is impotent or powerless to fertilize their own pistils, though perfectly able to fertilize those of other varieties; and on the other hand the pollen of almost any other variety will usually act powerfully on them. Very many of our best pears and most of our apples are thus self-sterile and must be cross-fertilized in order to yield fruit; and since the pollen is not well adapted for distribution by the wind those varieties are dependent for pollination on insects, and very largely on bees.

Experiments thus far have been confined mainly to pears and we are now able to give provisional lists* of the varieties which are more or less completely self-sterile or self-fertile. Those mainly self-sterile are: Anjou, Bartlett, Boussock, Clairgeau, Clapp's Favorite, Easter, Howell, Lawrence, Louise Bonne, Sheldon, and Winter Nelis. Those which appear to be completely self-fertile are: Angouleme, Bosc, Buffum, Flemish Beauty, Kieffer and Seckel. Experiments enough have been made with apples to show that in all probability they are even more dependent on bees than are pears. Most varieties are practically self-sterile and so far as we know none are completely self-fertile. It should be borne in mind that this impotency and sterility of apparently perfect flowers has but recently been brought to the attention of botanists, at least in its important applications to horticultural questions, and we are still ignorant on many important points which doubtless will be cleared up by the experiments of the next few years. Meanwhile what we do know enables us to point out a few practical lessons, the observance of which will certainly increase our chances of good apple and pear crops.

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* M. B. Waite, Pollination of Pear Flowers, Bull. 5, Div. Veg. Pathol., U. S. Dept. Agr. p. 54.

It must be remembered that it is not sufficient to transfer pollen from flowers of one tree to those of another tree of the same variety; cross-fertilization can be secured only by exchanging the pollens of two different horticultural varieties. Under these circumstances it is folly to plant large orchards of any one variety; several varieties should be set in the same orchard, either in alternate rows or at least with not more than two or three successive rows of any one kind. If already set otherwise, and well grown, the trouble can be remedied in a few years by grafting. But most important of all is the presence of bees. It may do to depend upon your neighbor's bees, or upon wild bees, and of course flies, beetles, and some other insects assist more or less in cross-pollination. But you should remember that rainy, cloudy, or even cool weather may deter insects from venturing out at all, and in the short intervals of warmth and sunshine they will naturally confine their visits to the most accessible blossoms; so that your crop of apples or pears may be a partial or complete failure for lack of a few hives of bees which a little more forethought would have provided easily.

DISCUSSION.

LED BY JOS. A. PEARCE, GRAND RAPIDS.

I was interested in the remarks of Mrs. Mayo, who stated the necessity of having strong men and women—thinking of an expression I heard once, from a physician, that a human being was, to all intents and purposes, two hours after it started life, all that it ever would be; that all after acts were simply developments.

This is a fact also in regard to our fruits. They are perhaps, two hours after the blossom has fallen, significant of the fruit as it will mature, and all other circumstances are simply developing and bringing up the fruit.

In the pollination of the fruits, there is an important factor, viz., the bees; they are very necessary to help with the proper pollination or scattering of the pollen, carried on by the atmosphere. The bees help in still weather when the wind is not blowing to bring about this perfect pollination which is necessary for the perfect fruit.

Bees are essential to the pollination of fruits; they never themselves open sound fruit, and so if they do take a few cracked peaches, or fruit that has been opened by other insects, they ought not to be blamed for the crime of opening it. I have seen peaches in times of drouth, in which holes had been cut the size of a pea; as soon as the peach softened, the bees would go in and clean it out. It would have been useless to ship, and was perhaps as good a use as the peach could have been put to. The same thing is true with cracked grapes.

In regard to the bumble bee; while there are many insects which help to fertilize the fruit, your red clover has to depend almost wholly on the bumble bee, for fertilization. How wilfully we have destroyed the bumble bee and allowed our hired men and boys to do it—(I never knew of the girls or women exterminating bumble bees).

Some ten or eleven years ago, we saw those beautiful summer bees trying to get into our buildings everywhere; why? Because we had a series of wet springs, which moulded the mouse nests, and they came to the barns to make their nests. We ought not to hunt them out of these places; I think it would be to the advantage of every farmer to resolve to never allow them to be destroyed, as far as his influence extends, because by so doing you put your hands in your pockets and pay big prices for clover seed.

WEDNESDAY AFTERNOON.

CURRANTS AND GOOSEBERRIES.

J. N. STEARNS, KALAMAZOO.

These fruits have been among the best paying of the small fruits for the past few years. This I attribute to the difficulty many experience with the currant worm. Formerly, nearly every farmer's garden had a supply of currants, but now it is a rare thing to see healthy bushes on the farm. It is thought to be a very difficult thing to keep the bushes free from worms, but we find it much easier than to fight the potato bug, which everyone expects to have to do. It is but little work to rid the bushes of the worms if attended to in time. This worm first appears just as the plant is coming into blossom, before the leaf is quite full grown, appearing in the bottom of the bush near the ground, and at first is very minute, so it is necessary to look very close to discover it. But this is the stage at which it should be exterminated, and if thoroughly done you will see no more that season. But you may be sure that if you allow only a few to escape and mature, you will have a second appearance about the time the fruit commences to ripen; then they must be fought with the hellebore, and it is much more difficult to rid the bushes of them than with the Paris green on their first appearance. My mode of destroying them is as follows: On their first appearance I spray the bushes thoroughly in the lower part, and be sure to go a little higher than any appearance of worms, with Paris green, ¼ pound to 50 gallons of water. I usually use the 50 gallons of the Bordeaux mixture, as it serves to head off any mildew on plant or fruit, although this is not necessary to destroy the currant worm, and the destruction of the worm is very essential, for if the bushes once become defoliated by this insect, they are rarely brought back to their original vigor. I call to mind a plat of two acres near my place, set some seven years, and while young the worms were allowed to destroy the leaves, and that plat has never borne a paying crop.

PROFIT IN GOOSEBERRIES.

In the beginning I said these were profitable small fruits to grow, and I can say while I grow nearly all the fruits that are adapted to this climate for market, both large and small, no one fruit has paid me so well up to this time as the gooseberry. But I may say I have a little fear of it in the future, as it is being so extensively planted and is a fruit not so universally used as the currant and other fruits. There is one feature that is applicable to both these small fruits, of such importance to the grower who will study the wants of his plants and be prepared to supply these needs, that he may find them a very remunerative crop. That feature is that they will rarely produce over two good crops without a liberal dressing of fertilizers. In fact I know of no fruits requiring so liberal feeding, and none that will so readily respond to such feeding. I have picked from one acre 470 cases, or 235 bushels, which yield I attribute to a liberal dressing of well rotted barnyard manure and ashes, applied separately and worked into the soil by frequent cultivation.

The bushes require annual pruning, so pruned that the bush will not be too thick, and continually have good thrifty young wood to produce from. Do not set closer than six by six feet for gooseberries, and five by six feet for currants. They should be set in the fall if possible, as they start very early in the spring. Let your gooseberries get ripe before harvesting, the same as the currants.

These fruits, as do most small fruits except grapes, prefer a moist, sandy soil, and the better this is fitted by enriching and pulverizing before planting, the better they will pay. My practice is, just before winter sets in, after the bushes are pruned, to plow up to them with a one horse plow, letting the plow run as shallow as possible. The ground is left in this shape until the fruit is set in spring. This leaves a furrow in middle of row for water to run off, and I think makes the bushes less liable to spring frosts.

DISCUSSION.

The Chairman: The discussion is announced to be led by Mr. Z. V. Cheney, of Grand Rapids; as he is not here, I would like to have any one discuss this or ask questions of Mr. Stearns.

Q: What about the Lancashire Lad gooseberry?

Mr. Stearns: I have tried them all, but the Downing is the only variety I have found of any value to grow for market.

Q: Can you get a bright red gooseberry that would make jelly like currants—if so, wouldn't that be more desirable?

Mr. Stearns: We find that the Downing gooseberry makes a jelly which, in our opinion, is fully equal to the currant jelly.

A voice: I have the Columbus. It is a great bearer and a good grower, but it is almost always green and is thick coated. It produces, however, enormously.

Mr. Stearns: I always prune my gooseberries so that they are quoted in the markets as the English gooseberry, on account of the size.

Q: What sized plants do you recommend setting?
Mr. Stearns: I prefer the year old plants.
Q: What time do you prune?
A: In the fall.

SUCCESSFUL STRAWBERRY GROWING.

R. M. KELLOGG, IONIA.

I would like to correct an erroneous report that I saw in the paper. It stated that I was making an attempt to cross the strawberry with the milkweed, for the sake of furnishing the berries and cream from the same plant. I have no intention whatever of injuring the dairy business by any such operation. It was simply a mistake.

There is beyond question a new era dawning for the strawberry culturist. We are coming to understand the habits and nature of the plant and a more complete knowledge of its requirements, and are therefore able to meet its wants and thus secure the highest development.

In the past, plants have been looked upon as things without life, unconscious and incapable of appreciating generous treatment. We now know they are as fastidious to food and environment as is your favorite cow or horse, and will as generously respond to good care. When placed in uncongenial surroundings they manifest their displeasure in a thousand ways; when furnished with a deficient or improper food, they become lean and lank. When bounteously supplied in kind and quantity, they take on a vigorous, robust appearance.

While I am not prepared to discuss the amount of intelligence plants possess, I yet believe they are conscious of their existence and know their surroundings. Who will look upon a wounded plant in the agonies of death, witness its limp and drooping form, manifesting all the symptoms of suffering shown in the animal under the same conditions, and then say it does not feel pain? We know they have their diseases and remedies and a plant doctor would fill a long-felt want; in any case it will be safe to treat them as if they were high class animals. God's first great commandment was to multiply and replenish the earth, and to that end all trees and plants were included in the order, and endowed with the strongest passions to accomplish this great purpose. When a plant is left uncontrolled it will throw its whole being into this one effort until its life energies are wasted, and it becomes impotent and incapable of performing that function. Stockmen understand this, but fruit growers are slow to learn that restriction and selection of perfect specimens are as necessary in the plant as in the animal, if we are to build up a strong fruiting power. We lose sight of the fact that an attempt to fruit is the carrying out of this original command to multiply its species; that all fruit grows as a receptacle for the seeds to grow in.

What is a seed? Simply an egg. If we take an egg and keep it at the desired temperature the required time, we get a chicken. Taking the acorn and placing it in proper moisture and heat, we get in due time the great oak, and so on through all the animal and plant kingdoms. Like begets like and plant life is not an exception. Under constant restriction and selection we build up all good qualities, and under neglect and excessive breeding they degenerate to a mass of scrubs. If we will visit the orchards and berry fields of the State, we shall find an abundance of evidence of this fact. Some are yielding bounteously, while others are barren.

WHAT IS A STRAWBERRY PLANT?

Simply the rooted bud of another plant. In the Alpine varieties we increase them by tearing the crowns and stools apart, but in our varieties they are separated by "wires" or runners; in both cases, it is but the division of the old plant. Whatever weakness or strength the plant has exists in the divided plants, and its multiplying or fruiting qualities are only strengthened by its new rootage. As an evidence of this, find hundreds of plants with good foliage but bearing no fruit. Find two good plants with good foliage, but the one loaded with fine, large berries while the other supports a mass of small, seedy specimens. Why the difference? The only explanation is that one is in full vigor and the other is exhausted. The development of fruit depends upon potency of pollen and vigor of pistils. In the one case, pollen was so low in vitality that while it could bring life into existence, like the scrub colt, it could not develop itself. What is the remedy for all this? There can be but one answer and that is restriction to ability to impart the highest life or potency to the pollen. I am willing to be held responsible for saying that maximum crops cannot be grown annually where plants are allowed to shed their pollen every year, as is now the universal practice. An extra large berry cannot be produced if the pollen is low in potency. Blossoms should be removed every spring in the propagating beds before they open that they may be relieved of the excessive secretions of pollen, and all buds or plants should only be taken from those of full fruiting vigor possessing all good qualities, and when once allowed to spend their whole energies in fruitage, should not be used for further propagating. In proof of what I have said, let me call your attention to the apple orchards two years ago. No man ever saw such a bloom. Every twig and branch was covered with flowers and the owners rejoiced in the prospects of a magnificent crop, but what followed? Little fruit set and the blossoms and embryo apples fell to the ground; what remained were knotty and gnarly. Why? Because the tree had no power to impart to the pollen a potency sufficient to bring life into existence, and the two years following have scarcely enabled them to recuperate. Excessive bloom is one of the dangers to be accounted for the coming season.

THE SITE.

Now having described the requirements of plants for high fruitage, let us select the site. My ideal for soil is a heavy sand or light clay loam with as perfect cold air drainage as possible. The fertilizing should consist largely of potash and phosphoric acid; sparingly of nitrogen in order that we may secure fine texture, rich flavor and high color of fruits, and the best forms of securing these ingredients are found in fine ground bone and unbleached wood ashes. Barnyard manure is always recognized as a standard fertilizer, but advanced growers have come to consider it as too rich in nitrogen, which produces foliage at the expense of fruit; hence should be applied sparingly in the fall or winter so the rains may carry it down and thoroughly incorporate it with the soil. All coarse straw and refuse should be raked off and not plowed under. An abundance of root pasturage should be provided for and consequently every particle of the soil should be pulverized and brought in contact with the oxygen to render the plant food available, and a reservoir created under each plant to hold water to tide it over the drouths of summer. To accomplish this, we go over the surface of the ground with a spading harrow, then use the Acme harrow and cut it up and aerate it. Then go over it with a heavy roller to firm and mash any remaining lumps; plow as deeply as possible without bringing to the surface too much subsoil at once.

Then follow with the subsoil plow and break up the lower dense stratum as deeply and make it as fine as possible, so its particles will admit and hold many times as much water as in its natural dense condition, which shall be returned to the surface by capillary action for the nourishment of the plants. We now roll the ground and then go over it with a spading and Acme harrow until the whole upper stratum is as fine as sifted ashes. It is then finished with the roller and an inch of surface loosened up with the weeding machine to prevent evaporation. In this condition the ground should be allowed to remain two or three days, that the water may come up by capillary action and collect under this loose earth to nourish the plants.

GROW IN HILLS.

My ideal in strawberry growing is to confine strictly in hills. The advantages are that inasmuch as all plants are isolated, each has an abundance of root pasturage, light, and air so that the highest development of fruit is secured. The imperative requirements for hill culture are that the ground be very rich and free from white grubs and destructive insects. The runners cut off are fully compensated for by having the original plant stool up and assume immense proportions. The plantation can be kept in bearing from four to six years because nearly all the berries will be large and are picked as soon as ripe, thus relieving the plant, and having comparatively few ripening at one time, a strain which its abundant rootage can easily sustain. As all the fruit is in plain sight, it can be picked much easier than hunting through the dense foliage of the matted row. Then we are able to use the weeding machines nearly all summer and keep a fine dust mulch over the entire surface, having a perfect conservation of moisture with very little or no hand weeding. The runners can quickly be cut with a sharp hoe, or much faster with the aid of the runner cutter. This involves much less work than many suppose, if you got at it right.

The half matted row is the next best thing. All runners are kept off until July. The weed seed having all germinated and having been killed by the weeding machine and a fine dust easily maintained, the large, vigorous plants secured will now throw out strong runners, which under the influence of fall rains quickly strike root, and if we go along the edge with the rolling wheel runner cutter made by the Planet Jr. Co., and clip the runners off, it will throw its strength back to the first embryo plant, causing it to make new crowns, throw out many new roots, and assume large proportions before winter stops its growth. The plants should never be allowed to stand within eight or ten inches of each other, if first-class fruit is desired.

In the full matted row, plants are allowed to form at once. The usual summer drouth prevents them from rooting and they blow around all summer on the ground and twist up into ropes, taking the strength of the mother plant which can form no new crowns and in the fall has few vigorous fruit buds. The plants set so thickly many can secure only a limited root pasturage and thus are easily exhausted. Light and air, the great promoters of plant growth, are shut out. At fruiting time, each plant is loaded with many berries too small to pick and they are left on the vines to rot and sap the plant's vitality, so that if it shall produce a very large crop, its life is so weakened that it cannot again produce even a fair crop, and may as well be plowed under at once.

For hill culture, set 30x30 to be cultivated both ways, or if weeding machines are used, put plants 18x30 inches. For half matted row, set 18x42 inches and allow plants to set not over one foot wide in the row. In full matted row, set rows four feet apart and 18 inches in the row. One thing I wish to emphasize and that is the absolute necessity of cultivating the ground on the same day the plants are set, if the soil be very dry. The feet of the workmen tramp the ground down hard close around the plant, capillary action brings the water from below directly in contact with the hot sun and wind, and the ground soon dries out to a great depth, and hundreds of plants perish, whereas if the surface is stirred up to destroy capillarity, the water would collect around the roots and every plant live and a vigorous growth be sustained from the start.

CULTIVATION.

If the ground is fairly mellow and friable, the Z. Breed Weeder, in the hands of a careful and skillful man, will go over the ground at the rate of 25 acres a day, killing all little weeds and doing all that can be done by any cultivator, and I regard it as one of the greatest labor-saving machines ever devised. During an excessive drouth we cultivate every four or five days and immediately after every rain. The rain causes the ground to settle together so that capillarity will again bring the water to the surface to be carried off by the sun and wind, and consequently the capillary passages must be broken up.

In the fall as soon as frozen, mulch with any old straw, and in the spring rake from immediately over the plants so they can come up through. As soon as growth starts, examine for rust. If it is found in any quantity, spray with Bordeaux mixture at once, wetting all foliage thoroughly and it will not further develop, but leave the subsequent growth healthy and clean. After picking, mow off the leaves, stir up the mulch, and burn all insects and fungi, taking great care to set it on fire when the wind is blowing high so it will pass over the ground rapidly and thus not injure the plants. The new roots will now come out above the old ones, so we take a small mold-board plow and throw about a half inch of soil over all the plants. Break up the ground two or three inches deep between the rows and go over it all crosswise with the weeding machine till all is reduced to a fine dust. Moisture will again quickly collect under the loose earth and dust even in the dryest time, and subsequent cultivation between the rows will maintain a vigorous growth until freezing ends it.

I am aware that many people regard this as too much fussing, but if they will take a careful inventory of the work performed, they will find these methods put the expense account far below the old way of doing things, while the cash results will be found much more than doubled. There is no use of producing fancy fruit unless you let people know you have it and make your offerings to those who can appreciate a good thing. Always put your label on fancy fruit in such a way that it will be a guarantee of quality and quantity. Arrange to sell direct to families or to some one dealer, and always label fruit so people will look for your brand.

If you have a really meritorious article and present it to people in proper shape, you will always be short of supplies. The present and pressing demand is for fruit of the highest grade and the people are anxious and willing to richly reward the person who can furnish it, and will anxiously wait for your coming.

DISCUSSION.

LED BY THOMAS WILDE, HERRINGTON.

Mr. Kellogg said that their apple trees, two years ago, bloomed so they couldn't bear. I have found the difficulty to be pollen weakness, and that seems to be his great trouble. I have seen the time when the bees swarmed among the apple blossoms, and there wasn't any pollen weakness then and the trees were set too full; they had to be picked off. As far as some of his methods are concerned, I have nothing to say against them, he is all right.

I thank the College for the bulletins, for they contain a vast amount of information, and the progressive man who tries to get all the improvements will find plenty of frauds. One of my neighbors sent for "pedigree" Wilson strawberries, supposed to be a sport of the old Wilson and a great improvement. But he received in return the same old played-out Wilson. Was there any sport about that? He said he had no *doubt* of it.

We have heard some most ridiculous statements about pollen weakness compared to seminal weakness in animals. Such comparisons are an outrage upon nature. The future would be dismal indeed if the male sex of plants, which is the sole custodian of the embryo that is to be transmitted to the future race, should have such a weakness. We never find male weakness in plants; the finite law is so strongly guarded to perpetuate its kind that it is lavishly provided from one hundred to ten thousand times more strong and potent pollen than is needed to impregnate the ovules of its kind. All the bi-sexual plants are rich in pollen.

In some varieties one row will fertilize four of the pistillate varieties, while in others, which blossom less profusely it requires two. Care should be taken to plant together those which blossom at the same time.

The female plant is equal in importance to the male in the fecundation of fruits. When the stigma is mature and moist with receiving fluid it only requires one grain of pollen to each pistil.

We have heard of large crops of trashy strawberries, but we prefer a nice crop of bright, plump berries that have quality and will bring the cash.

The following are good sellers in our market: Sharpless, Cumberland, Crawford, Jessie, Long John, Brandywine, and Gandy, for fancy. For general use: Beder Wood, Van Deman, Crescent, Greenville, and Warfield, and I see no objection to Belle of La Crosse, and some others.

Mr. Nelson: I would like to know how you select strawberry plants.

Mr. Wilde: My idea is to select a plant in the spring, from a bed used the previous year. We eliminate all the weakness by propagating from a robust plant, a perfect plant that shows a large crown. It is a simple method and pays; then I cut off all the blossoms before they open, for the purpose, as I explained, of preventing pollen exhaustion. Then I let one or two berries grow. I watch them, and scale from one to ten, from the most perfect plant down; I then cut off the other plants, and if necessary put on a weak solution of manure, and then I cut plants, and keep a propagating bed, and next year I take them to this bed and let them root. The next year, I set the fruiting field from this bed. The next year, I make a selection again, taking care to cut off the runners. I don't care about cutting the runners from pistillates; I would just as soon they would keep themselves exhausted; I depend upon perfect flowers set near them. I have investigated this matter thoroughly and have satisfied myself beyond question that it is of the greatest importance to keep them restricted, and in full vigor.

Q: You say you pot your plants? How many from the same runner?

A: All I can get.

Q: Hasn't it a tendency to weaken the variety to take four or five away from the parent plant?

A: I don't like to pot because it is a bother, but in potting the plant you only take one runner for a pot, and nip off the wire beyond that, and it will root much quicker. Be careful not to let them get pot bound; I don't think much of potted plants.

Q: What would be your list for the local market?

Mr. Kellogg: I left out the whole question of varieties from my paper on purpose. You say that a certain variety is a fine berry, and some one will jump up and say it isn't so, because he has tried it. You might succeed with one variety here and it would be no good at all somewhere else.

For local market, I would set on rather heavy sandy soil, or heavy clay, the Warfield. But in the Institute work I have found a great many who had failed with the Warfield, because it would not root on sandy soil. After I got through with the Warfield, I would set the Haviland, and the Cumberland, if it can be kept in good shape and not allowed to run out. For a later berry, the Greenville is the coming berry. The Enhance is a good fertilizer for it, but it is a little irregular. In some localities it is not liked so well, but it is large when the others get small. The Gandy ripens its berries all at once, and as it is loaded with seeds does not produce heavily. The berries do not grow large, uniformly; you will get a few very large ones. The Martha is the leading large berry, but you know that berries that grow to excessive size do not produce as many bushels. I make as much perhaps off the Martha as any other. There is a long list of berries which have had their reputation generally, and locally. I always cultivate plants largely for the main crop, that you hear of as successful everywhere, and when you get a variety adapted to your soil and location, you have a good thing; I cannot tell you what it is.

Q: Have you tried irrigation?

Mr. Kellogg: No, sir; except a weeder and mulching heavily. I expect to put in a large irrigating plant this spring.

Q: Do you set in the fall?

Mr. Kellogg: Possibly you can set strawberry plants in the fall, August, and get big plants, but I cannot. I never got a big crop of berries until I had first grown large plants with long roots.

Mr. Wilson: Irrigation is becoming a necessity in this State. I had an experience in irrigating, on the west coast of Michigan. The first crop I planted was corn, on a strip of land three rods wide by fourteen rods long, and I planted the corn eighteen inches apart and fourteen inches between rows. There was a stream of water at a little distance, and knowing that water would be good for plants anywhere, I dug with my spade until I got the stream started to running between the rows of corn, changing it from one row to another; and that corn which had begun to turn brown and dry, after the water was put on it, began to get green again, and grew twelve and fourteen feet high. I fed the stock all they wanted, night and morning, and then had a hundred stalks left. After that I put the land into strawberries and have been irrigating strawberries ever since then, and it has paid.

Instead of putting on a lot of bulky stable manure, full of grass seed, I have arranged a system of troughs, with a cistern to gather up the liquids, which I use on the strawberry bed, mixed with the water from the stream. I have raised in that way strawberries that weighed over an ounce. I always have good berries, dry or wet, and when some of my neighbors wouldn't have a berry my beds would be full. I have averaged on a bed, fourteen rods long by two rods wide, about thirty-two to thirty-five bushels.

Mr. Gunson: How long, under ordinary circumstances, is the stamen of the strawberry receptive?

Mr. Kellogg: I simply would say that I have never determined. I have always been careful to watch the appearance of the blossoms and stamens, and to select those varieties for fertilizing which opened before the pistillate varieties. The life of the pollen continues for several days. I never have determined the length of time, but I am careful about that. If you attempted to fertilize the Warfield with the Enhance, or any of the late blooming varieties, you would find the first strawberries would be buttony and deformed; you should select an early variety of a perfect flower for an early pistillate variety and a late variety of both kinds. Have the perfect flower a little earlier than the pistillate.

Q: Will the variety used for fertilizing affect the size or quality of the berries?

Mr. Kellogg: That is a question that has been disputed. I believe that congeniality in plants is as effective as in animals. There is no way of determining the variety that would secure the best development. As to flavor and size, I am not prepared to say that it would secure it any further than if the potency of the pollen was high. Some experiments have been conducted in this line, and it has been attempted to prove that it does make a great difference; I believe it depends on the potency of the pollen as to the development of the fruit, and that the particular variety cuts very little figure. This is only a matter of opinion, however; the question is not definitely settled, and it has been discussed for twenty years.

Mr. Wilde: Mr. Kellogg has given us an excellent paper, but I apprehend that quite a large proportion of this audience are farmers. Taking his paper as a whole, they may think it is a little intricate for them to grow berries successfully. I wish to throw in a word for their encouragement. I have grown strawberries for market for twenty-five years, and I believe the way to obtain the best results is to plant a new plat every spring; set the plants as early as you can, and cut off the blossoms, or the buds before they blossom, then allow them to run in rows, not allowing the row to become over a foot wide; make a new plat every spring, and plow up the fruiting plat every spring.

It is all important to have the best fruit in order to hold your reputation, and nothing will do it like having a new bed every season, and you can do that with less work, by setting a new bed, and not attempt to pick but one crop from a setting.

Q: How early do you plant?

Mr. Wilde: Just as early as you can put the plants in the ground. As soon as the plants begin to grow and new rootlets shoot out.

Mr. Wilde: What does Mr. Kellogg mean when he says to plant from those which have not borne fruit? Does he mean that some people do plant after berries have been raised?

Mr. Kellogg: If you have the correspondence I have, you will find that nine-tenths of the people fruit their strawberries three years and then take out the runners. I can see that in this audience, it was hardly necessary to give this precaution, and yet all over the country they are doing it. After fruiting seven or eight years they will take plants from them, and farmers have come to my house and wanted to get plants out of my bed, when I was going to plough it up. Of course advanced strawberry growers don't do it. As Mr. Stearns says, you want to take new plants that have not borne fruit. For instance, you set plants last spring; you took the blossoms off; take up the runners from them and set a new bed; pick the blossoms off, and then let them fruit the first year after you set them out. That is what we call plants that have not borne fruit; that have been kept continually restricted.

THE VALUE OF SPRAYING IN HORTICULTURAL ECONOMY.

PROF. L. R. TAFT, AGRICULTURAL COLLEGE.

Before we enter upon the topic itself, I want to be sure that you understand the real nature of the topic—what spraying really is. It is, as you know, not a very old proceeding; it is only, perhaps, fifteen years since the real spraying of trees commenced, and as we understand the word, it means the application of material to our plants to prevent the attack of, or lessen the injury from, insects and diseases. When we spray, we apply in a liquid form the materials designated as insecticides and fungicides. The insecticides are designed to destroy or drive away insects, and the fungicides are materials adapted to the destruction and prevention of plant diseases. Nearly all plant diseases are of a fungous nature, and hence the word fungicide naturally comes in here.

The use of these materials enables us to grow better crops. As you are aware, the insects that attack our plants may eat and destroy the foliage, or they may suck the juices and thus rob the plants of their nutriment. At other times we find the insects in the trunk of the tree, and these practically girdle them, as a disease would.

It may be that they will feed upon the leaves and destroy them, or so injure them that they cannot perform their functions. The leaves of a plant are its lungs, and perhaps its stomach, and plants can no more live without lungs and stomach than can an animal. If in any way these leaves are injured, to that extent will the growth of the plant be affected.

In other ways, too, these diseases injure our plants; they feed on the plant, however, just the same as the insect sucking out the juices. In some cases, if they are on the stem of a plant, they will girdle it and we also find them upon the fruits; and, as you are all aware, a fruit covered with scab is unsightly and often unsalable. The appearance is greatly injured, and frequently the fruit is destroyed. We have all seen examples in the case of the grape rot, where every cluster in the vineyard would be destroyed by this terrible disease. Against all these, we have remedies in the insecticides and fungicides. The only question is, whether we can make it pay to apply them, for the purpose of destroying the insects and diseases. I am sure, if you would go over the State and talk with the people who have for years been using these materials, you would have the answer all one way. It is of value.

THREE PRECAUTIONS.

But before any one begins spraying, there are three things he must do. In the first place, he should inform himself as to the nature of these insects and diseases. The different insects vary in the way they obtain their food, and we must adjust our remedies with that in mind. When insects are found eating the leaves of plants, or in any way cutting their food and chewing it, we can destroy them by the use of poisons. We can employ Paris green and London purple.

We have another class of insects which do not chew, but which have a snout and suck out the juices, and if you attempt to put on Paris green for these you will meet with failure. For this class of insects, we must take remedies that kill by contact, perhaps, like kerosene emulsion, which, if it touches the insect, will kill it.

Then we have other remedies that tend to drive away the insect, and these can be used with success; still it is best to pin our faith to the arsenites, so far as the chewing insects go, and generally, if we have to use anything for the others, it is well to use the kerosene emulsion.

Again, regarding the plant diseases. We should understand how they work and how best we can fight them. These diseases, for the most part, are of a fungous nature; they have nearly the same organs as the higher plants; they have roots by which they get their food from the "host," i. e., the plant they feed on; they have stems and branches and develop spores or seeds. These spores grow something the same as the seeds, sending their roots into the host plant and destroying it. Regarding this class of diseases, if we can keep our plants covered with copper sulphate the spores cannot germinate. It has been found that a solution of one ten-millionth part of copper sulphate will prevent the germination of many of these spores.

But this brings me to the second thought I have.

WE MUST SPRAY EARLY.

If the disease once enters the plant, nothing we can do in the way of prevention will be of any avail. It it too late to get the full effect.

We must get there first, and then we can hope for good results from our spraying, and we must be thorough.

It may now be of interest to consider how it is that this copper sulphate is of value. If we spray the tree, using the solution in water, the water evaporates, and we have the copper deposited on the leaves. In that form it does no injury to the foliage, but if a spore falls on the plant it must have water to germinate and this same water dissolves the sulphate, and we have the solution present, wherever there is water enough for the spore to germinate. The question was asked if a solution of copper sulphate was as effectual as the mixture known as the Bordeaux mixture, made six times as strong, and I replied that I thought it was. The Bordeaux mixture, which is perhaps the best of all materials to put on, from the fact that it will not burn the foliage if properly used, and that the lime acts as a sort of whitewash, is not soluble. It is in suspension, and we have to have the action of the carbonate of ammonia of the air, to dissolve this. This dissolves the copper slowly, so that it needs to be stronger to cover the season, and thus be effectual. I would certainly make the Bordeaux mixture several times stronger than the copper sulphate solution.

THE PRACTICE AT THE COLLEGE.

Our own practice upon nearly fifty acres of fruit is like this. In the spring we spray the trees thoroughly, before the buds start, with a solution of copper sulphate, using one pound in twenty-five gallons of water.

We spray the trees thoroughly with this. Then we wait until the new growth starts, about ten days after the blossoms fall, commencing perhaps three or four days after, and spray it again. But we cannot use the copper sulphate on these, because it burns the foliage if used alone; so we add the lime. For every ten gallons we take a pound of copper sulphate and a pound of lime, dilute each one-half, and put them together, making ten gallons of each. Then we have the Bordeaux mixture ready for use. The old way was to dissolve and dilute after mixing. The gain in this case is that it does not settle to the bottom so quickly; it stands up better in the water if we take a pound of each, slake and dissolve them, and add five gallons to each, making ten gallons, and the mixture is complete.

At this time I would add Paris green, four ounces in fifty gallons of water. Thus we can spray and cover the leaves for the diseases, prevent the spores from starting, and by applying the poison at this time, guard against the leaf eating insects, and the codling moth. Repeat this application at the end of two weeks, and ordinarily this will answer. Sometimes I find it desirable to spray again, and perhaps even a fourth time, with the Bordeaux mixture, and it is not a bad plan to keep on with the Paris green.

THE APPARATUS.

I advise the spraying of our trees thoroughly, and to do that we should have an efficient spraying apparatus. My first spraying was with a kind of squirt gun, and many farmers try to spray orchards now with pumps on the squirt gun order, and they are discouraged with the whole thing. The earlier pumps made were not adapted for the purpose, and the nozzles would soon clog, the valves would wear out, and there was trouble all along the line. Get a powerful pump and have one that is of brass, so far as the working parts go, as the copper sulphate destroys the iron pumps. You will then have an efficient pump, but have it powerful enough to throw the stream over the highest trees.

Then, too, the old pump was supplied from a bucket or barrel, and while the barrel may answer in small orchards, I believe it better to have something larger than a barrel. We use a tank for the purpose, an ordinary stock tank, with a cover fitted to it; we placed this on wheels and put the pump on top of it, and as the team draws it along, it keeps the material in suspension and prevents settling. The tanks hold from eight to twelve barrels, and we can spray for hours without running dry. It is a great saving to have a large tank, and in our case we can often work a half day on small trees without reloading, and on ordinary soil the draft is not great, unless we get over eight barrels, and I always plan to go to the firmest ground first.

In regard to spraying materials and apparatus, I would advise that we use some form of extension rod; the old plan was to hold a nozzle in the hand; that was improved upon by having a little longer hose and having a pole, but in that case we had to lift the heavy pole and hose; now small gas pipes are sometimes used, ordinary galvanized iron pipes, with a nozzle at the upper end, and the spray is large and the amount of water small. Better than that, we have now the brass pipes; they are more durable and lighter. Better yet, is the bamboo pole, in which we find a small brass pipe, with the nozzle at the upper end. The nozzle, I may say, is perhaps often the weakest point in the outfit. For this purpose we want a nozzle that throws a fine stream, and the finer the better. Best of all, perhaps, is to have a double Vermorel nozzle, working both nozzles at one time; a good pump will work four nozzles and we can reach all points with the fine spray. It is wasteful to use a coarse nozzle so that there is a stream rather than a spray, but by having rods twelve feet long, if you can stand on the wagon, you can be nearly as high as the ordinary fruit tree. Be sure and get an easy working pump.

WILL SPRAYING PAY?

Will spraying pay? From our own experience, I am convinced that it will. The farmer with a large area of fruits, or with a small area either, cannot afford to be without some outfit for spraying his trees, and he ought to get a good one, from the fact that it is one of the most unpleasant things imaginable to get out in the field and have something go wrong, with two men and a team standing there, or having to send miles to get a broken piece. Get a good pump, spray early and thoroughly.

It has been suggested that possibly spraying might do harm. Of course it can. Unless you have the mixture properly made, there is great danger of injuring your trees, so I would again refer to my first suggestion, and that was, to post yourself thoroughly in regard to the matter. Then, before treating all your trees, test the mixture on a small scale, and be sure that the spray you have prepared will be right and will not injure the foliage.

There is a question, too, about injuring the fruit, or the stock perhaps with the poisoned fruit, but analysis shows that if properly sprayed there is at best only a trace of poison on the fruit. If we should go to work and spray our trees in July or August, there might be a chance of this whitewash sticking on it, but we spray in June and use only one part in a thousand, and it will not do any harm and yet is effectual for the purpose used. As for injuring stock, that has also been tested; stock is often pastured under sprayed trees, and without evil effect. We spray until the trees begin to drip.

As to the injury to the soil. The Germans claimed a few years ago that spraying injured the soil, but we find that ordinary garden seeds, tender as they are, will grow where there is perhaps a half per cent of copper sulphate, and we can spray for years without getting anything like that amount in the soil. It was claimed that it injured the soil and there was a great loss of potash. At best, the loss is very small, and if we have lime there, as carbonate, that will stop any loss of potash, so that all along the line, I have yet to hear of any argument that will hold against spraying, provided it is properly done. As to the real profit, it seems to me that it depends largely upon the care of the fruit, the ground and the surroundings. I believe that if a person has a suitable location, and has given his plants good cultivation and the proper supply of plant food, he can greatly reduce the danger from disease. But for all that, I believe that it will pay to spray once or twice all of our fruit crops, and it will pay a hundred fold sometimes. Three to five gallons will spray a large sized tree with the copper sulphate, and it need not cost over six to seven cents for the largest fruit trees, and in this way, we can, as has often been the case, double the value of our fruit.

In our own experience, taking the apple scab alone, where perhaps only 12 per cent were free from scab without spraying, we had only about the same per cent that were scabby where we sprayed.

But to return again to the three points that I wish to impress upon you. I would first post myself thoroughly as to the character of the insects to be fought and the diseases troubling me; the best remedies and how to apply them; obtain an outfit adapted to the purpose, and then spray thoroughly and early. If one does this, I am convinced that he will meet with success, and that spraying will pay him and the expense and trouble will be more than repaid by the results he will obtain.

DISCUSSION.

LED BY W. K. MUNSON, GRAND RAPIDS.

In my experience, and from observation, I think it is beyond doubt that spraying is paying well. The only questions for us to discuss are the proper materials to use, when to use them, and how to mix them in the most economical way. As Prof. Taft has said, it takes a very small quantity of copper sulphate to destroy spores. I think one of the greatest failures has been in not keeping the mixture properly agitated so that sometimes we apply it too strong, and at other times not strong enough. The scientific part I shall leave to Prof. Taft, but I will give you one or two practical points.

I make a stock solution of the materials, by dissolving 50 pounds of sulphate in 50 gallons of water, putting the sulphate in a canvas bag and suspending it in the water; in about three days it will dissolve entirely. I take fifty pounds of lime in a box and slake it. When I get ready to spray, I take six gallons of the sulphate of copper, put it into my tank, and sifting through a flour sifter six pounds of lime, then add a quarter of a pound of Paris green, and fill the tank so it will hold 100 gallons—which is much weaker than the Bordeaux mixture is generally made, but with the agitator I have, which is a power machine, it keeps these in solution all the while. I think the results are just as effectual as if it were made stronger. I use more water though; on ten acres of grapes I use twenty barrels of water. I spray generally two or three times a year on the grapes.

Mr. Morrill: Does it ever curdle with you?

Mr. Munson: No sir, it never has.

Q: How much water do you put on the lime—that is, dry after it is slaked?

Mr. Munson: Just enough to wet it.

Q: Do you spray the grapes or fruit trees while in blossom?

Mr. Munson: No sir.

Q: Do you never spray anything in blossom?

Mr. Munson: No sir.

Q: At what stage do you usually spray?

Mr. Munson: I spray, first before they blossom, and perhaps twice afterwards, with an interval of ten days between.

Mr. Rice: Have you had any experience in killing the lice on turnips? Some of our people have tried everything, and had to give up the fight.

Prof. Taft: It is one of the hardest things we have to kill. I don't know of any way to do it to advantage. Kerosene will do it, but they are under the leaves, and it is troublesome to reach them all. I don't know anything better, however.

Q: What of arsenite of lime for spraying?

Prof. Taft: The arsenite of lime is nothing new; it has been used for a number of years, and while I am glad to speak of it, I want to put in a word of caution as to handling it. It is so often taken for some of the household chemicals. I saw only yesterday, how someone took some arsenic for baking powder. Be careful to label it, and have it colored in some way, for it is an unsafe thing to have around. So far as using it is concerned, this last year I took up the matter because I found there was a trust controlling the Paris green, and the price was double what it ought to be, and knowing that arsenic was cheaper, I went to work and prepared a material that would not burn the foliage, was easier to apply, and was inexpensive. In doing this, I took one pound of white arsenic, put it with an equal or double weight of lime, put these in about eight quarts of water, and boiled the mixture. Be sure that the material is dissolved. If it is not dissolved, there is danger of burning the foliage, and until you have made one or two mixtures, I would advise you to try it on a small scale. If properly dissolved, it is less harmless than Paris green or London purple. It is about the same thing as the London purple, without the purple, and you are more certain of getting a pure article. We have in this case, about one-third pure arsenic; if we have equal parts of lime and arsenic, I would use a pound of arsenic to 200 gallons of water. This is not injurious to the foliage, and is perfectly safe, provided you have first dissolved the arsenic, and by using the lime with it, it is easier to dissolve. If you want to be sure, you can test it by purchasing at the drug store a little bottle of "H_2 S."—such as is used in the laboratory. It has the odor of rotten eggs, and a drop of that in there, will at once tell if it is properly dissolved. If you use that amount of lime, and boil it half an hour, there is no great danger. It costs about one-quarter as much as Paris green, and pound for pound is as effective.

Q: I would like to know if the copper sulphate spraying, before a peach bud starts, has any effect in preventing leaf curl.

Prof. Taft: Indirectly; anything of that kind put on before the leaves start will destroy the spores; the spores of this disease are around the buds. But for leaf curl, I would spray again as soon as the blossoms had fallen, with the Bordeaux mixture, although I think this first spraying is worth one or two sprayings later.

In regard to pears; the blight is troubling the pear trees in certain localities, and it is thought that spraying would have an effect in lessening it, but we are not quite sure about that yet. The only thing I can recommend, and of course you all know that, is to cut off the diseased portions as soon as you see them, cutting a foot below where it appears, and burning at once.

Q: Have you had any experience in the cart sprayers?

Prof. Taft: The gentleman I think refers to the one made in Ludington, which pumps air into a cylinder, and under pressure the water is forced out, and I believe if we could get a cylinder that would be air tight, it would be an effectual arrangement. The one I saw seemed to leak. I think in time we shall have something that works, as this does, by horse power. I have used power sprayers working ordinary pumps, and though perhaps no better than hand pumps, I have had good success with the one at the College. As a rule I think it is fully as cheap to use a strong hand pump as to use power pumps. It is possible the compressed air will work to advantage; they are also making them to work by steam.

Q: What about the grape-vine flea beetle?

Prof. Taft: That is a pretty tough beetle to kill. As a rule if you practice thorough cultivation and there is no waste land around, you will have far less of them. I think it is a good plan to fall plow; then spray in the early spring with arsenites and a good deal of lime; that is about as good a remedy as we have yet. If you put on the Bordeaux mixture with Paris green, you will destroy the mildew, and, slowly, this beetle also. It is a tough insect, and it takes some time to kill it, but if you practice thorough cultivation and spray regularly, I think you will have little trouble.

Mr. Morrill: At Rochester, N. Y., two weeks ago, I heard a novel remedy for this class of insects. A gentleman was troubled with leaf hoppers, etc., and he devised a scheme; he made a frame work, covered it with paper, and manufactured bird lime; he would carry that frame along side a row of grapes, and a man would follow on the other side, with bushes in his hand, with which he kept striking the vines, and they would catch millions in this way in a short time. He would then smear it over again with the lime, and use it a second time. It is well enough that we understand that, because there is no doubt but there is something in it.

Mr. Arthur: Ten years ago I tried that same experiment with tar and it worked to perfection.

Mr. Morrill: This gentleman covered his frame work with canvas, then took brown paper and covered it with bird lime. It was a dark color and they ran right against it. When he had finished with one, he put on another paper, and used it again, and he caught millions.

Q: Is there any wash you can apply to a tree to keep out the borer and not injure the tree?

Prof. Taft: I practice washing the trees at the College, for this purpose, but as Mr. Morrill gave a caution this morning against the use of washes, I would suggest that if you use anything dangerous, you try it only on a few trees at first. The wash I use I have found entirely harmless, and would feel safe in mentioning. For half a barrel of the material, take perhaps a peck of lime and as large a quantity of wood ashes. We value the lye from the ashes, and they will color the lime so as to take off the white color. You can take ordinary water lime, that serves the same purpose, and it will stick on to the tree better than the lime. After rubbing off the loose bark, put into 25 gallons of water two or even four ounces of Paris green, and if you can be sure of getting the right material I would add a half gill or a gill of the crude carbolic acid. A small quantity—a half gill—would be enough for this, and would be perfectly safe and effectual.

Regarding the use of this, I know some large growers who, instead of using the ashes, will take the ordinary potash that you can buy, and dissolve that, putting in just the milk of the lime, adding the carbolic acid and Paris green, and apply with a spray pump. It can be done in a quarter of the time taken to wash the trees. If there is a little depression it will run down and destroy the borers. It will give you a smooth bark, and with a smooth bark we are less liable to have the borers.

For curculio, to be very sure, I would practice jarring and go over the trees often enough to be sure, but I would even then first make use of the spraying; I would go about it as I recommended in the first place—just as soon as the blossoms are fallen, I would spray with Bordeaux mixture and Paris green, repeating the application once or twice every ten days, making it weaker toward the last.

If you have a large amount of fruit set, the few curculio that would survive would not be numerous enough to do any great harm. You would have more than enough fruit left; if you only have a few blossoms, they might take all you had, from the fact that these insects are of a family that is hard to kill. It takes some little time before they are killed, and in that time they may lay eggs, and probably would, and they might lay enough to take all the blossoms you had. It is possible that some of this poison, if properly applied, will get in where the egg is, and if that is done, it will be pretty sure to destroy the young worm.

Judge Ramsdell: Prof. Taft was given a solution for coating the trees for the borers. I have found an effectual remedy for small peach trees. I wrap them with a glassy paper, such as is used for packing butter; it protects them perfectly for it is so glassy that the cut worm cannot climb it. I have used that now for two years, on small trees; it is very effective, and can be done faster than the hilling.

Q: Can Prof. Taft tell us what kind of a spraying nozzle to use, what make?

Prof. Taft: There is no particular make that I would recommend, but nearly all spraying firms have the Vermorel nozzles, and where you can use the long pole, so that you can get within four feet of where you want to apply it, and putting two together, you will get along about twice as fast.

Next to that for the large trees, I would recommend the McGowen nozzle. Either is good. The McGowen will throw farther than the Vermorel, and there is a good stream too. Any dealer has them, or can get them for you.

Many of the others that throw fine sprays are all right, but get a nozzle that will not clog. The Vermorel is cleaned by pushing through a little pin. The McGowen cleans itself; a spring gives way.

Q: What is the best method of preparing the lime so that it won't clog the nozzle?

Prof. Taft: I slake the lime as I would for mortar and can keep it that way any length of time. As I have generally prepared it, I would take the amount of lime I wished to use, say enough for a barrel of water—perhaps four pounds, and a fractional amount of my copper sulphate, and having made my dilution, I put them together and then test that; there is a very simple test that can be applied—the ordinary ferrocyanide of potassium; you can buy it at the drug store and place it in a bottle of water and it will dissolve; add a drop or two of this and the material will, if properly mixed, make no change of color. I always use an excess of lime. I put in lime enough so there will be no change with this test, and then add some more. I strain in the material, after having made my dilution. I use the finer particles of the lime; if properly slaked, however, the lime will be in a fine state. I don't like to use air slaked lime, but look out for burning—that is as bad as the air slaking.

EXTRA SESSION—DISCUSSION OF FRUIT TOPICS.

The interest in fruit was so manifest that nearly the whole audience remained for an hour to discuss miscellaneous fruit topics.

Q: How would you prune standard pear and plum trees?

Prof. Taft: In case of the standard pear, it depends on the variety. Many are upright growers; in case of the Kieffer, I would head them back severely for the first two or three years, and would at the same time thin out the surplus branches. If you head back, as in the case of the peach, it thickens up too much. In case of the plum, our own practice is to head back the trees somewhat and thin out at the same time; after that we have them in good shape and they grow without pruning. We merely thin out the surplus shoots.

Mr. Stearns: I rise to answer another question asked some little time ago, which I consider of importance to peach growers in Michigan. I believe one of the worst things we have to contend with in peach growing is the curl leaf, although this last season was such that we had but little, but for the past five or six years it has been a great bane to peach growing. One season we lost nearly our entire crop.

Now I want to give you my experience in spraying to prevent that—in spraying before the trees blossom. I sprayed thoroughly with the Bordeaux mixture, which is equally as good, I think, for that purpose. I used two pounds copper sulphate in 50 gallons of water, but was sure to reach every portion of the tree. I sprayed for the curl leaf this last spring, but the season was such that it was not so necessary; but the year before, I sprayed for this purpose, and another orchard, which adjoins mine and is of the same sort—well, you could see which was sprayed as far as you could see the two orchards. I want to impress upon you the importance of spraying to keep off curl leaf. I believe it is also effective in heading off the black knot and the pear blight.

Now in regard to pruning. I don't believe that any of us do enough heading back in plums and pears and peaches, and I have followed the practice, on the dwarf pears, of heading back from one-half to two-thirds of the previous growth. This depends on the form of course. Many, like the Bradshaw, that make a strong upward growth, as well as the Sheldon and Bartlett pears, I head in two-thirds of the last year's growth. This, however, is especially important on the dwarfs.

Q: At what time of the season do you do this?

Mr. Stearns: In March.

Q: It it profitable or wise to thin plums?

Mr. Stearns: I have found it too expensive to thin the plum as we do the peach and pear, by hand. I do it mainly by pruning and heading back.

Mr. Boss: In pruning, if there are trees affected with the yellows, is it dangerous to go from one to another—that is, is there danger in going from a yellows tree to one that has not been affected?

Mr. Morrill: Yes, and if you have any yellows, it is important that you carry a dish of crude carbolic acid with you, and dip your pruner or knife in that acid. We have so thoroughly rid our orchard of yellows that we have not had a yellows tree for three years.

Q: Where you have a peach tree which has been pruned correctly from its first year, up to the third, fourth, or fifth year, is there any necessity of thinning the fruit?

Mr. Morrill: Yes, sir; if you prune correctly you will have immense crops of fruit on what there is left, probably three to five times as many as you want, and if they are all left on it will break the trees down.

Q: What is the first symptom of yellows?

Mr. Morrill: You are very fortunate if you have never seen it. The first symptom is the premature ripening of a few specimens. Perhaps the balance of the tree will be green fruit; or it may be within a week of the time of ripening, and then when you pick the fruit you will find red specks on it, that run down through the flesh like red veins.

Mr. Clay: In answer to the question of when should you trim, there is, at the Farmers' Club at the county building here, an illustration of this, prepared by Mr. Slayton. There are samples of wood, cut from trees that were trimmed every month in the year, showing day and date when the branch was trimmed or cut back, and showing of themselves how well they have healed, and what is the time to trim.

Mr. Preston: It is my impression that the time to cut a limb is when it is hard; it will dry up hard.

Mr. Bramin: What strength is the Bordeaux mixture, used for spraying peach trees, after the leaves have come out?

A: I use four pounds sulphate of copper and about six pounds of lime to fifty gallons of water. I use this excess of lime so there will be no ill effect from the sulphate of copper. You can use twice the amount of Paris green, if you use a little excess of lime. The lime counteracts the poison.

In regard to the pruning; if you prune for wood growth, prune in March or April; if you prune to set a tree into bearing—an old tree—prune while making a vigorous growth.

Mr. Taylor: I want to say a word in connection with what Mr. Stearns referred to in regard to spraying the peach for curl leaf. I made a trial of that a year ago last spring, with very marked results in favor of the spraying. I sprayed before the leaf buds made any appearance of growth and the buds had commenced swelling, and the results were very marked.

Further; in regard to cutting back at different times of the year. Two years ago this past December, I was in New York state, where they make some showing of fruit culture, and in the vicinity of Geneva they were cutting back their plum trees in December. Whether they were wise or not, I do not know, but it was evidently a uniform practice there, and they were following it up, from year to year.

Mr. Stearns: If we could have such winters as we had two years ago, or three or four years ago, you might do that in December, January or February, but if we get an old fashioned winter, and you do pruning, you will find you have two or three inches of dead wood.

Q: As peaches are in the ascendancy now, we are not up to the times unless we are setting trees. We have this to contend with; we are all beginners, and we get a peach tree from the nursery, and go into the orchard to set it out. How shall we trim it; one man tells me to cut off every limb; the next man says, don't cut it at all; the third man says, head it back. Now how shall I trim that tree?

Mr. Whitmeyer: My method is to cut off all the limbs and leave the whip stock, and then cut off half the whip stock.

Mr. Morrill: The first man was all right, and the next was all wrong—and still the first man was not definite enough. There is a difference in trees. The man who understands his business will not trim every tree alike. It depends on the growth in the nursery. The man who takes an extra large tree will find that the buds have nearly all developed into limbs. If you cut these all off, you have few or no dormant body buds left to form a top from, if cut off at the ordinary height. It is a good practice to cut off at 2½ feet. When you strike a tree of that character, select the limbs to form the top from, and leave the stubs with two buds.

When you have a medium sized tree, you will find that those buds are not developed into branches; cut off every branch in this case, and then you will get more than you want. It requires judgment, and the habit of observation is very essential in these matters. Conditions may change, and a rule that applies to one tree may not apply to the next. Look into these matters. The man who says leave all your top on, is dead wrong.

Mr. Clark: It is evident that the raising of grain is a failure, so far as the present condition of things is concerned; it is attributable to many causes, no doubt. I think our country, becoming older, has exhausted, to some extent, its ability to produce grain as in the early days; further than that, the question of transportation has unquestionably worked against the grain interests.

In answer to this question, "What shall we turn our attention to," hundreds of thousands of trees are being planted this year, as being more profitable than grain raising.

Q: What is the ideal peach tree, as to form, etc?

Mr. Morrill: You have given me a big contract to try to answer that, but I will be as brief as possible. I suppose you mean a tree that has age—in the orchard, and what it should be like?

Q: How do you trim it? How high should the branches be? etc.

Mr. Morrill: There is a difference of opinion on that. I like to head them at thirty inches, twenty inches of clean body, and I want to grow them as nearly uniform as possible. We cut back each year one-half the annual growth on the main leaders, stocking the limbs and keeping the bearing weight near the body and rounding the heads each year, so that they are symmetrical.

Q: I have some trees that have been trimmed wrong then. They are large trees, six years old, and there are trees among them with a body six inches through. These trees are spreading out; a heavy yield will break them down.

Mr. Morrill: In that case, I should take screw eyes and drive on the inside of these limbs and attach wires to these; run the wire around among the limbs, so that as they get to spreading, they will relieve the crotches; have each limb support itself from the other, on the opposite side; take some large-sized screw eyes, strike a scratch awl into the tree, set your screw eye in; then run galvanized iron around there; when done draw it tight; the fruit sagging will draw it tight. The screw eyes should be on the inside of the limbs, to prevent cutting. Let the weight rest on the screw eye. It does away with all props, and prevents them from breaking down.

Mr. Thomas Mars: There was a remark in regard to the grain farmer, which I cannot endorse, that he is exhausting his land; and that he is becoming poorer from producing grain. I deny that; I have traveled all over Michigan, and I have known the State ever since I was a boy when the country was in its virgin condition, and I want to say to the gentleman that there is being produced today more per acre than ever before in the history of this country, and the farmer who will deteriorate his soil as a grain farmer, or as a fruit grower, is not entitled to the credit of being called a farmer. He ought to have his farm taken away from him, and let it be given to the widow, and let her run it.

Another thing I want to say to the grain farmers, don't abandon your calling; keep along in that channel. If you could turn a little to dairying, do so, but don't leave out the grain, because these poor fellows who are grubbing in the sand over here to get some fruit, will die for the want of bread. I just want to give the grain farmer a hint that the fruit growers predominate in this audience.

Mr. Lester: I am one of those grain farmers, and I have held right to it. I have been in this country 44 years, and on my farm I can raise twice as much wheat as 44 years ago, with less work. But whether we raise fruit trees or grain, we have got to use plenty of manure; there is nothing quite equal to it.

Q: How about clover?

Mr. Lester: Don't get sick because you lost your clover. I think if you would come up to my place, we could show you as good a crop of clover as you would wish to see. We lost some last summer, but we bought more the other day and we are going to sow it. In California I notice they go to sheep corrals and buy the manure by carloads; what will you do with these sand hills, if you don't have something to keep the land up?

Mr. ————: I came to St. Joseph the 12th of June, 1837. The soil then was a virgin soil. The farmers of that section thought they were getting a fair crop of wheat if they had 11 to 13 bushels an acre. Last year, with the drouth, we had a very poor crop of wheat, and yet it averaged over 14 bushels to the acre. We had a severe drouth, and we have had for nearly twelve years. Now, sir; I don't believe you can raise peaches or anything else without moisture; we have no difficulty in getting a good catch of clover, but the clover will burn up in four or five months of burning weather; but I merely wished to say that the idea of deterioration of the ground and of the crops raised is a mistake. We are raising more to the acre now than fifty years ago.

Mr. Clark: I have noticed that quite a number of peach growers make the mistake of heading the trees too far from the ground; I am satisfied that cutting off 20 inches from the ground makes a better orchard.

I would like to inquire of someone who has had experience, whether or no crimson clover is a good fertilizer for orchards. It is only an annual and it will kill out itself, of course, except the roots, and I have some hope that it may prove a fertilizer and a producer of moisture for our peach orchards, and if so that will supply a great need among the fruit orchards, where we are obliged to purchase commercial fertilizers.

Prof. Taft: I would say in reply that I believe it is desirable to at least try crimson clover. It is not an entire success, from the fact that it has to be sown in the summer time, and frequently it is a long time in starting; it is also likely to be killed in the winter; but last season, even sowing it along in the early part of August, a rain gave it a fair catch, and we have now a fair stand of clover.

I believe that this light crop, even though it is winter killed, will be of enough benefit to pay for the cost, and if it does hold over the winter, it will be best of course to turn it under early in the spring; but for the best success, sow early in July, if possible, or the last of July, and the chances are you will get a fair catch. I believe it is profitable, even if it does winter kill.

Mr. Wm. Ball: All men cannot raise fruit. All farmers have not the ability, land or location. I apprehend that many who are going into the fruit business will fail. They do not give it the attention necessary. The same thing applies to grain raising. We cannot all be grain, fruit, or stock raisers—in this locality, fruit raising is undoubtedly the best business to engage in, but I wish to say by way of warning, that those men who are going into fruit growing must be energetic and determined to succeed, and must use every possible means to succeed, or they will fail, just as many grain farmers have.

Mr. Kellogg: Don't get scared about fruit growing in western Michigan. Don't let the grain growers scare you off. I have been spending a week among the agricultural students, and I took particular pains to inquire what they were going to do about fruit growing; and a little over a year ago I was all through Pennsylvania, Illinois, and Ohio, and everywhere they agreed that the peaches are to be grown in Michigan, and I don't think you can ever grow quite enough.

Q: How far apart is the proper distance to plant peach trees?

Mr. Morrill: 20 by 20 feet.

WEDNESDAY EVENING.

THE FARM HOME READING CIRCLE.

H. W. MUMFORD, AGRICULTURAL COLLEGE.

In December, 1892, the Michigan Agricultural College, believing that it would be for the interest of the farmers of this State to organize what was known as the Farm Home Reading Circle, prepared a course of reading which would be suitable and adapted to the needs of the farmers and fruit growers of this State. Not only were the faculty consulted in this matter, but practical farmers and fruit growers, as to what books would be best for this kind of work. To those acquainted with agricultural literature, it is known that there are few reliable agricultural books published today. There are so many men, too, writing for agricultural papers, who are not practical men. They write simply as a pastime or a matter of business. We cannot overlook the fact, however, that there are men who do write from a practical experience, and so far as possible, the management has selected the best possible writers on the different lines of work.

Since the organization of the Farm Home Reading Circle, it has steadily grown. While perhaps the farmers have not taken up the matter and pushed it as we had hoped, yet it has had a steady and healthy growth, and we feel very much encouraged for the future.

There are five classes of reading offered. Soils and Crops; Live Stock; Garden and Orchard; Home making; and Political Science. We have these five classes in order to accommodate all classes of farmers, gardeners, and stock breeders; some would be most interested in the class, "Soils and Crops," others in the class of "Live Stock," or "Orchard and Garden." Not only this, but it was thought advisable to include a class on "Home Making," which would be especially adapted to the ladies of the farm; and another on Political Science. Any member may select any three of these classes, and after finishing the reading of all three of the classes, he has completed the course.

In class one, "Soils and Crops," there are offered five books, the first one being "First Principles of Agriculture." This is an elementary work on agriculture and takes up some of the simplest and most easily understood scientific principles of farming and applies them to practical every day life. This is followed by a book on "Soils and Crops," which is somewhat more advanced; we have attempted, so far as posible, to arrange these books in a progressive manner, just as is done in the schools. The third book is denominated "Practical Farm Chemistry." This is simply a treatise on fertilizing and keeping up the condition of the land. It treats on the subject of plant growth, the needs of the plant and its proper food—the same as a book on stock feeding. Another book is "Silos and Silage," by Prof. A. J. Cook. This is a practical work that treats of the building of silos, and the advantage of silage as a stock food.

In nearly every class we have put in a few books that are elective. We mention four or five books, from which the reader can take his choice. I will go through the other classes and name the books offered. Class two, "Live Stock." The "First Principles of Agriculture," Mills & Shaw. The same book as used in class one, but it takes up the second half of the book. Second, "Horses, Cattle, Sheep and Swine," by Geo. W. Curtis. It is a treatise on breeds of live stock, and by reading this a man can get an idea of the breed of stock best adapted to his individual needs. "Stock Breeding" is the third book. It takes up the breeding of all classes of animals, and treats it in a practical way from the standpoint of a practical farmer. Now in live stock, we have so many and varied interests, that it would be necessary to mention several books, from which the reader can take his choice. "American "Dairying;" "Cattle Breeding;" "Shepherd's Manual;" "Swine Husbandry;" "Horse Breeding;" "Practical Poultry Keeper."

In class three, Garden and Orchard, the books recommended are, "The Practical Fruit Grower," "How the Garden Pays," "Ornamental Gardening," "Insects and Insecticides," "Gardening for Pleasure," "Propagation of Plants," "Home Floriculture," and "Practical Floriculture."

In class four, Home Making, "Helps for Home Makers," "Anna Maria's Housekeeping," "A Study of Child Nature," "Hygiene of the Kitchen," and "How the Other Half Lives."

Class Five, Political Science: "Elements of Political Economy" and "American Commonwealth" (two volumes), by Bryce.

In order to complete a course, a member selects some three classes, ordering the books, whenever he is ready for them, and wherever he pleases, but the secretary of the Farm Home Reading Circle has been very successful in securing wholesale prices on all these books; we get the books at what they cost, with the postage added. You can get one book, or all the books in a course, or in a class, but usually one book at a time is ordered. Members read this one book, and they are then requested, but not required, to send to the secretary for questions on this book. The secretary sends examination questions, and then the reader answers these questions, just as would be the case with a class of students. The secretary looks over the papers, and if they are satisfactory, he sends a certificate showing that they have finished the book. When they finish a class, they receive another certificate, and when they finish the three classes they receive a diploma, which states that they have finished the prescribed course of reading of the Farm Home Reading Circle.

We shall issue several of these diplomas this winter to members who have finished the three courses; don't think that they have done it in one year, because they are all busy people who have to read as they get leisure, and some of them have been at it ever since the Circle was organized, and some will finish this winter. If you do not wish, you are not required to send in the reports at all. You can order the books and get all the privileges of membership without any reports or examinations.

If there is one subject in which I am more interested than another, it is the education of the farmer, for I believe that there is need of it. Not that the farmers as a class are ignorant—I think that the average farmer is more intelligent than the average workingman of any other class, but

I do believe that there is need of education among the farmers, and I think there is education needed along a practical line, and this is the attempt of the Farm Home Reading Circle—to bring within reach of the farmers the education which they cannot secure otherwise, and an education which is practical and helpful in everyday life.

I might say that we realize as well as anyone that the Farm Home Reading Circle is not perfect, but we are making an honest effort to improve the educational features of the Circle, and we are trying, the best we are able, to bring it within reach of every farmer in Michigan.

Q: What is the expense of this course?

Mr. Mumford: There is no expense whatever connected with the Farm Home Reading Circle except the purchase of the books that are used in the course. The people outside of the State are charged a membership fee of $1.00, but inside of the State, there is no expense whatever, except the purchase of books. The books can be secured at the wholesale price, and they vary from 15 cents to $3.00. It depends on the kind of book you get, but the total expense of the first class is, I think, $3.13.

FORCING VEGETABLES UNDER GLASS.

THOS. GUNSON, AGRICULTURAL COLLEGE.

Horticulture is in full sympathy with the ceaseless activity of the age. Vegetables are grown in greater variety, of better quality, and the markets are supplied earlier and later in the season, than was considered practical by previous generations of men.

Perhaps the most satisfactory returns in the vegetable business have been made with the aid of well managed hot-beds; but the increasing difficulty of getting sufficient stable manure, that has heretofore served the two-fold purpose of heating and fertilizing, at anywhere near its real value, is compelling growers to erect permanent glass houses, heated by steam or hot water circulating through iron pipes, for growing vegetables in winter, spring, and early summer. I am not prepared to say whether vegetables are any better grown in this way, but there is the advantage of their being grown with less care and at less expense, besides being able to keep up a constant supply at any season of the year. Thus equipped, the vegetable grower is not so dependent on seasons, as he practically makes what weather he requires, and his goods are ready to sell at a season of the year when competition is not so keen, and prices rule higher. There is abundant evidence to prove that this way of growing vegetables is rapidly growing in favor. Thousands of feet of glass houses are being built every year for this purpose alone. Near some of the large eastern cities this work has reached a degree of perfection never dreamed of a few years ago. In fact, it was only after there had grown a demand for fresh vegetables in winter and spring by these being brought from the south, that any attention was given to growing them in the north in this way; and now, the greenhouse product is made to compete successfully in the home market with the goods brought from

Florida, and is offered at a price but little higher than the freight charges on the latter from Jacksonville to New York.

There is no doubt but the following can be profitably grown in this way: Lettuce, radishes, spinach, beets, dandelions, cauliflowers, asparagus, celery, with the possibility of cucumbers, tomatoes, beans, strawberries and others.

METHODS.

I am not going to give any lengthy details as to the various methods of growing vegetables in glass houses, for those who take up this generally have methods of their own; yet it is somewhat encouraging for others to know that the men most successful in the business knew very little about it when they began. Neither am I going to offer any suggestions by way of improvement on the method, or variety in growing a vegetable that has already made Grand Rapids famous. It may not be out of place for me, however, to mention a few things in connection with the work that has been so successfully carried on here. Next to lettuce as a greenhouse crop come radishes, and the variety largely used is the French Breakfast, as it has a short top, is a quick grower, and of good quality. There are others of the turnip rooting kinds that are equally good. The seed is sown for the first crop from October till April. The crop is usually ready for pulling about eight weeks from the sowing of the seed. Grown in this way it will be seen that three crops may be grown under the same glass each season. In our variable climate spinach never reaches the degree of perfection that it does in the milder and moister climate of Europe. Severe frosts during winter either kill it outright, or early summer drouths arrest its development so that it seldom produces the large, thick, savory leaves it would do if grown in greenhouses.

Dandelions are not used to any extent in Michigan as a vegetable, though in the east they are considered the best substitute for spinach, and as they are among the few things that grow to perfection with us in dry weather, it will be some excuse for their determination to be just where they are not wanted, if they can be forced as an early spring vegetable. The variety used, however, is the Improved French thick-leaved, and the seed must be sown the year previous to its being forced, on good rich land, and kept well cultivated. Rhubarb is easily forced in any place where there is a moderate heat; but the quality is better, and the color quite sufficient if it is grown in the dark; hence, when put under the stage in a greenhouse, or any other place where it can get a fair share of light, it does not possess that apple-like flavor it would do if grown in a dark place.

Asparagus grows to perfection anywhere in Michigan, and yet ten days of warm weather last May reduced the price below the cost of gathering it. By extending the season, say, from one to two months by growing in a greenhouse perhaps a fair price could have been obtained.

There is another delicacy worthy of consideration at this time, and that is mushrooms. It seems to me there is a possibility of developing a large business in them alone. Only a few years ago the growing of mushrooms was enveloped in mystery. They did not come from seed; they were planted in dark caves or cellars, or under greenhouse benches; nobody seemed to know much about them and the record of failures far outnumbered that of success. They are becoming more manageable as we understand them better, and the prospect for their being more generally used is very encouraging. They are grown very successfully under greenhouse benches, though I believe it pays to build houses especially adapted for them. Like tomatoes, cucumbers and beans, unless near a large city, a steady market would have to be built up; but it is the opinion of those that have tried them that the demand is steadily increasing. Cucumbers, tomatoes, beans and strawberries are other possible crops, but as they require more care and expense to grow, it is a question during the early part of the winter at least, whether there is sufficient demand to make them pay.

TOMATOES.

It is said that in the city of Baltimore only a few years ago, they never expected tomatoes before the local crop ripened in July. Now the Florida crop begins to come early in January in a fresh and healthy condition, as it requires little over a day and a night for transportation, hardly longer than is required to bring the local crop on schooners from the lower estuaries of Chesapeake Bay. These early tomatoes sell readily for 50 or 75c. a dozen at the same time that oranges are bringing from 15 to 30c. a dozen, and while canned tomatoes are selling for 15c. a can. The same can be said of the lettuce business in Grand Rapids. Ten years ago we would have ridiculed the idea of finding a market for the crop which there is no trouble in getting rid of today. It is true that the lettuce men in Grand Rapids are not making as much money as they did three or four years ago, but they are all agreed it is their best paying crop yet. It is difficult for some of us to see how, with present prices, it can be grown and sold at any profit.

The business of growing lettuce in greenhouses at Grand Rapids has been imitated in many places throughout the country; the result is, that there is placed within the reach of the man of moderate means an article of diet that during the winter season has been considered a luxury.

THE LABOR.

The work of caring for vegetables in glass structures is being steadily reduced. Away from cities the difficulty of getting a sufficient water supply at all times necessitated considerable outlay; even this is greatly simplified. Several experiment stations—our own among the rest—have proved that crops can be grown in greenhouses quicker, better and cheaper by a system of sub-irrigation. This is done by laying lines of three inch porous tile three to four feet apart and six inches from the surface in solid beds; or on the bottom of benches made of boards, dressed on the sides and nailed tightly together, and having a thin covering of Louisville cement in proportion of one part cement and three of sand and applied with an old broom or whitewash brush. This protects the boards and makes the bed nearly water tight. The ends of the row should be blocked, and an occasional hole made in the tile, say, every twenty feet to apply water either from a hose or watering pot. It is also well to lay the tile on a slight grade in order to draw off any surplus water there may be after the soil has taken up all it can. This also provides against careless watering. Crops take less water, less care in applying it; it lessens the possibility of fungous diseases, and increases production.

Another thing that has contributed more perhaps to the development of this business than all else is the complete evolution of the greenhouse itself.

PROGRESS OF THE METHOD.

The progress made in constructing vegetable houses has been chiefly along the following lines:

1. Greater ease and economy in construction and durability. 2. Better arrangements for light, heat, and ventilation. Many of the modern vegetable houses are constructed entirely without benches, and where a site can be selected, say, against a bank or side hill, having a slope to the south, they are much better without them.

It is needless here to enter into details about the various methods of heating, but it is enough to say that greenhouses are heated cheaper and better than ever before, and what seems more encouraging to us in Michigan is that there is being found in several parts of the State a cheap kind of coal that is adapted for the purpose. Horticultural builders throughout the country stand ready to furnish all the information needed on any system of heating, or any style of a house, and its probable cost, by giving dimensions, location, and purposes intended.

There is nothing new or mysterious about this work; nothing but what any ordinary intelligent man can do, in short it is simply an extension of the vegetable business besides having at least some of the following features: Competition is not so keen. Only men of experience and judgment are likely to succeed. It places fresh vegetables on the market at a time of the year when they can't be got in any other way, as in the case of cauliflower and celery in the months of May and June.

Unless the average man now in the business seeks to supply the home markets of the future with fresh vegetables grown in this or some other way, during the winter and spring months, we fear his prospects are anything but encouraging.

The possession of our markets for so long a time, by goods brought from the south, is detrimental to home growers, as it is claimed the public taste for a certain vegetable has been satisfied by the southern product, before the home crop is fit to use. And if we are to have a continuation of dry seasons, it is with the aid of the telephone, cold storage, increased facilities for transportation, that wealthy individuals, or corporations, owning large tracts of rich bottom lands, will seek to supply the great bulk of the vegetables required to supply the city markets, especially during the summer months. The collection of any product at a given point in this way insures a large steady supply, and this attracts buyers and usually produces better prices. But with the individual, we have reached a point in this, as in many other things, where the more a man raises the worse off he is. It is quality, not quantity; it is brains with the aid of muscle that tells with him.

There are many difficulties in the way of growing vegetables under glass that can only be learned by experience, but for those who love to care for growing plants there is a great deal of pleasure and comfort in the work outside the profits there may or may not be in it, that has to serve as compensation, in many cases, for care and close attention given at a time of the year when the rest of nature is covered up in snow and ice.

A PLEA FOR UNITY OF ACTION AMONG FARMERS.

HON. F. W. REDFERN, MAPLE RAPIDS.

I spent the month of January in talking at Farmers' Institutes in different sections of the State. For the first two weeks I talked in the fruit belt, and I expected to find among the fruit growers of western Michigan, shippers' associations, and clubs, organized for the avowed purpose of advancing the interests and increasing the influence of these gentlemen. But, with one exception, I was disappointed, so far as the shipping associations were concerned. I found at Fennville a shippers' association in active and successful operation. I found that there had been one at Ludington, but it had fallen into a state of innocuous desuetude. Farmers were standing with their hands on their hips and arms extended, saying, "Don't come quite so near to me. I would rather trust a middle man, whose interests are not identical with mine, to market my produce than a member of my own community." "I had rather trust my interests to some man who has no interest in me, than to trust a man interested in marketing products similar to mine," and yet they admitted that their methods of marketing were reacting upon themselves. I found them packing small peaches in the bottom, and in the middle of the basket, and large ones on the top, in the fond hope and expectation that they would create a demand for their product. They were packing in bushels, and fifths and sixth baskets, with the firm belief that they could obtain as much for the sixth basket as for the fifth, cheating, of course, their customers, and indirectly themselves.

A gentleman in business said to me once, "I believe that of all men, farmers are the most discontented and complaining." He said, "You fellows are always saying, 'It is too hot or it is too cold,' 'it is too wet' or 'it is too dry;' 'the wind blows too hard' or 'not enough;' if your crops are abundant, you complain because prices are low; while if your crops are short, you grumble because you have nothing to sell."

COMPLAINTS OF FARMERS.

It is possible that farmers do complain without just cause, but I would like to review, to some extent, the conditions under which agriculture is being carried on. Agriculture today is in a state of transition. The great forces of elctricity and steam are carrying the commodities of the earth into new places, through new arteries. In a business sense, it is no longer four thousand miles from the ports of New York or Rio Janeiro, to Liverpool, but only 200 hours sail from the granaries of North and South

America, to the millions of mouths in the Old World. You recognize it as a truism, when I say that the nations of the world are near neighbors, and any shortage in one locality is easily made up by the overplus of another.

In South America, the cattle are, as you are aware, pastured on great plains, where they can pasture the year around and under more favorable conditions than on our high priced lands. They also raise great droves of sheep; there are probably eighty millions of sheep in Argentine alone. They are on lands where they can pasture all the year around and their wool enters into competition with that raised on our high priced lands. And yet farmers wonder that there is no money in sheep raising. Farmers wonder that the price of grain is depressed. When you take into consideration the vast waterways that they have in South America, and how simple a matter it is to run the product of their wheat fields into the very vessels which are to transport it to Liverpool—and the amount of grain it is possible for them to export, running from thirty to forty millions of bushels, coming into direct competition with the wheat produced in the United States—the careful business man, looking about him, will investigate all these subjects, and see if there is still a margin for profit. It behooves the farmers of central Michigan to look these matters over carefully, before engaging in any other business. South America is not our only competitor; there is the great continent of Australia. Africa in the same way enters as a factor, so far as sheep raising is concerned, in the markets of the world. In wheat growing, Australia does not enter as a factor, but there is the great peninsula of Hindustan, with its cheap labor, and the plains of Austria, Hungary, and Russia, and the British possessions of the Northwest Territory, exclusive of British Columbia. Investigation shows that ten states, the size of Ohio, can be carved out of that territory, each of which can produce as much wheat as is raised in Ohio. And yet men are looking forward to the time when the price of wheat shall advance.

The farmers in the western part of the State are complaining of a deterioration of prices, and not only in the prices of products but in prices of land. While it is true that the prices of land have lowered in the western part of the State, still this deterioration has taken place all over the United States and all over the world, with a very few exceptions.

Farmers often complain, as well as other people, of conditions concerning them, for which there is no help; farmers ought to learn, as others have had to learn, that they must be content with the conditions that surround them. I do not mean by this that farmers must sit down in idleness, and allow things to take their course; they should put forth every effort possible to better their condition, and then not mourn or cry out against things that they cannot hope to make different.

GETTING TOGETHER.

I am to speak tonight, more particularly, on unity of action among farmers, and in this line I wish to show you something that may be accomplished by unity of action. A year ago, when the Michigan State Grange had its annual session, it was determined to put forth an effort a concerted effort to see if something could not be accomplished by unity of action. For that reason, the State Grange decided to press three particular measures, the tax statistician bill, the pure food bill, and the farmers' institute bill.

THE TAX STATISTICIAN.

With reference to the first; it was a measure directly in the interests of the agricultural classes. Farmers made the assertion that they were paying more than their just share of taxes for the support of the government. I believed that, but when asked for the foundation on which I based my belief, I had to confess that I might have gone through every department of the capitol at Lansing, and I could not find the first set of figures that would substantiate that statement. So the farmers set themselves to thinking about this, and they said we want a tax statistician, who shall ascertain if there is a foundation for this belief. Such a bill was framed, and today it is a law of the State. Col. De Land, the Tax Statistician, said that the very men to whom he looked to supply him with the necessary figures to make a compilation to present to the next legislature, and on which they should make a basis for a new tax law, that they were the very men who were standing in their own light, and refusing to give him the information desired. He asked me to call the attention of the farmers at the different institutes to the fact that this is a law that was enacted for their special benefit, and that when he wrote to the supervisors, they would in many cases pay no attention whatever to the letter. Farmers should insist that their supervisors answer all these interrogatories that it is possible to answer. This law was urged by the farmers, and enacted for the benefit of this class, and Col. De Land told me that present statistics, so far as he could get them, showed that real estate today was paying 87 per cent of all the taxes, and personalty only 13 per cent. Statistics also show that personalty should pay from 30 to 35 per cent. If farmers refuse to furnish the necessary information, who is to blame?

PURE FOOD.

So far as the pure food law is concerned, there was a bill that was presented, not at the particular instance of the farmers, though at the direct instance of the State Grange. It was believed, from the fact that Michigan was surrounded by states where they had pure food laws, that to a certain extent Michigan was the dumping ground for all kinds of food products, and that it stood the people of this State in hand to enact a law, authorizing someone, somewhere, to put a stop to this indiscriminate food adulteration. I suppose you all heard Prof. Rossman, the State Chemist, talk on this subject, so I will not dwell on it, only to say that that bill was the most bitterly contested one that came before the legislature. It was fought in season and out of season, fairly and unfairly. The best legal talent of this State was employed by the manufacturers and wholesale dealers to defeat that law. Not in the interests of the consumers, not in the interest of the public health, but in the interests of putting some dollars into their own pockets. Notwithstanding all that, the bill was enacted into a law, and is today in successful operation.

There is going to be the most determined effort, however, on the part of the interested parties, to effect its repeal at the next session.

FARMERS' INSTITUTES.

The Farmers' Institute bill also met with opposition, and I want to say that the opposition came from the very class of men it was intended to benefit. Why is it that farmers will strike at their own one little ewe lamb, and let the flocks of everyone else go? Are they so distrustful of one another, that they are afraid some one will get a little advantage? Some one who is a farmer? Why one man said to a lady of my acquaintance after one of the Institute meetings, "I have had all I want of that 'ere thing; I have been there about three hours and I haven't received a particle of benefit. That $5,000 might just as well have been wasted." At the same time, he took an old pipe out of his mouth and held it in his hand. He could not see where the people of the State were receiving any benefit from such meetings as these. But in all the meetings I have attended, I have to say that 95 per cent of the people with whom I have talked, have assured me that it was one of the best things that ever happened in their locality to have that Institute come among them; and one of the most helpful features, is the spirit of inquiry engendered.

Some regard it as an innovation that should be dispensed with. They say times are hard—we are willing to admit that; and also that taxes are burdensome, but is that any reason why the farmers should build up every other industry to cut down on the appropriation which is intended to afford them the information necessary to better their condition?

So far as unity of action by the State Grange is concerned, I want to say that through the influence they exerted on the last legislature, these three bills were enacted into laws. Anything which you ask in reason, you, as farmers, can get. As I once heard James Gordon Bennett of the *New York Herald* say: "If farmers would put their ears to the ground, and the politicians do likewise, and ask for what is in line with their interests, and ask unitedly, they could get what they wanted, and there was no end to the possibilities. If the conditions which surround farmers are not what they like, the farmers are largely to blame for it."

You ought to see to it that in all primaries and political conventions, men are nominated who are pledged, not to support the interests of the farmers alone, but the interests of all classes, and when the interests of all classes are served, your interests are protected.

OUR LEGISLATURE.

People talk, of course, about the legislature. Up at Whitehall, where I spent Sunday, I went to church, as a good member of the legislature should, and it happened to be a Methodist church which I attended, and the pastor said, "I have been told that down there at the legislature the chaplain made a prayer like this: 'Oh, Lord, I pray Thee to bless the government of the great State of Michigan, bless the State officers, bless the families of the members of the legislature, bless the members themselves, give them wisdom to enact laws that shall inure to the benefit of the people of this great State and to the perpetuity of its institutions, and oh Lord, make the members honest, and if you can't make them honest, make them just as honest as you can.' "

I don't know but that such a prayer was made; it might have been made in the days when Brother Mars was a member and sat in the Senate there, or it might have been made in the good old days when we had the old territorial form of government, but I want to say to you here, that the members of the legislature are the reflex of the citizens that send them there, and I want to say to you too, that if the proper element predominates in the primaries and political conventions of any party, you will find the reflex of this element among the members of the legislature.

In conversation with Dr. Kedzie, I asked him this question: "In your opinion, is any percentage in this large increase in insanity, due to adulteration of foods and drinks?" He replied, "I am firmly of the opinion that a very large per cent of the increase in insanity is due to the adulteration of foods and drinks, but particularly drinks." If this is true, when we take into consideration that it has cost the State nearly a million dollars a year for the care of the insane, isn't it important to find out what are the facts?

STATISTICS OF LIQUOR TRAFFIC NEEDED.

You can go down to the capitol at Lansing; go all through the different departments and you will hear men make the assertion that the liquor traffic has cost the State a certain amount of money and is responsible for a certain amount of crime. I want to say to you that you cannot find the first iota of proof in all the departments at Lansing to substantiate the statement. A bill was introduced at the last legislature, asking for the appointment of a commission, or in lieu of that, that the secretary or chairman of the Board of Corrections and Charities be authorized to make an investigation of this subject in all its bearings, and see what foundation there is for these statements—what are the facts. In order to legislate wisely and well, it is necessary to know what we are about. That bill was referred to the Committee on Liquor Traffic, it went into a pigeon hole, and has not seen the light of day since.

EDUCATION.

There is another thing, and that is the educational question. The last legislature passed a number of laws bearing on educational matters. I wish to say that they were all passed for the avowed purpose of advancing the interests of the children of this great State of Michigan. Most of you, or many of you, will remember, years and years ago, a song that they used to sing, and it began like this:

> "Of all the mighty nations, in the east or in the west,
> This glorious Yankee nation is the richest and the best.
> Then come along, come along, make no delay,
> Come from every nation, come from every way;
> Our lands they are broad enough, don't be alarmed,
> For Uncle Sam is rich enough to give us all a farm."

As a consequence of singing that and other songs, the flood of immigration began to come to our shores. It struck our eastern border like a tidal wave, and recoiled on the Pacific shore, and in consequence, in every city of any importance, all over the United States, we have the Irish, and the English, and the German quarter, and every other quarter but the American quarter.

One of the foremost educators of his day, Ira Mahew, said that our schoolhouses were the arsenals wherein were forged and made those public and private virtues which insure the perpetuity of this government. If those words were true, and I believe they were, and are, what ought to be the position of the farmers of Michigan today with regard to their district schools? Superintendent Pattengill says that the little red schoolhouse is the conservator of our liberties, and if that is true, the teachers who go into those schoolhouses ought to be American citizens. We thought so at Lansing, and we passed a law that all teachers after arriving at the age of 21 years, should be American citizens. We passed another law, that the flag of our country should be displayed in every schoolhouse. Some thought that was an unwise thing to do, but in view of the fact that we have so many different nationalities besides Americans here, it seems to me that it is wise to place it not only before the children, but so they can see that old flag in front of the schoolhouse; and I would have it enshrined in the heart of every teacher and pupil so that a spirit of loyalty shall grow in every schoolhouse in the State of Michigan. We passed that law, not for the sake of the money it was going to expend, but that we might build up within the hearts of the children in Michigan a love of country and a desire to see its principles vindicated.

On the whole, I believe that the legislature of Michigan tried to act for the best interests of the people within this great State. No law is better than the moral sentiment behind it, and it is a duty which you as agriculturists owe to this great State, that you be not only law abiding citizens yourselves, but that you insist that everyone else be law abiding, and if a law is wrong, there is the easiest way in the world to get it repealed.

DISCUSSION.

K. L. Butterfield: The farmers have been expecting the legislature to send them certain things they wanted, and usually those things have not come. In some cases, as in the instances mentioned tonight, the farmers have gone for the measures themselves, and then they got what they wanted. An illustration was given of what can be done. The signs of the time all point to farmers' organizations, and to a larger share of legislation which is not class legislation, but for the benefit of all. I have been attending the State meeting of the farmers' clubs, where the topic of taxation was the only thing discussed. It was discussed with intelligence and earnestness, and it seemed to me that it is a sign of great awakening among the farmers when these organizations get to working along legislative lines, and in an intelligent way.

There are two words that occur to me; one word is *organize* and the other is *concentrate*. I do not think there is any use in trying to get legislation, without first organizing thoroughly. There is no use in trying, if the farmers won't work together, and it seems to me to be the duty of every farmer in the State to join some one or more of the existing organizations in the State. Second, concentrate. It is not possible to get everything at once; but if the farmers will organize thoroughly, and go before the legislature every winter, with one or two broad, strong, just measures, I fully believe they can get what is just and fair. It has been done, and I believe it can be done again, and I am hopeful that sentiment has awakened in this line.

William Ball: If the action of the last legislature was a reflex of the opinions of the citizens that sent the members there, I am sorry for the opinions at home. I do not believe that the legislature last winter reflected the sentiment at home.

I listened with a good deal of interest to the remarks of the gentleman on the floor when he told us of the crops raised in foreign countries, the large number of sheep raised on the sheep grazing grounds—all very true. That there is a change going on in agricultural operations is also true; but he fails to tell us how we are going to remedy these difficulties. It is true that the farmers of the country are today under a stress of circumstances; we are not receiving for the products of the farm what we have been in the habit of receiving, we are not as prosperous as we would like to be. I believe, however, that agricultural operations in the United States today are on a par with any other business. That there is less difficulty in meeting our engagements, less failures, as compared with the numbers, than in any other business.

Now it seems to me that the conditions which were spoken of by this gentleman should be met; they must be met by the farmers of this country; we know our farms; we know fairly well how to manage them; we cannot change our vocation if we wish to, because every other is better filled than the agricultural department is, and hence the question arises, what are we going to do? Are we expecting particular benefits by way of legislation? I don't believe it. I believe the farmer who succeeds is the man who attends to his business. How many of the farmers in this audience work six or seven months of the year, and idle away a large portion of the remainder of the time, when they might be stopping the leaks on the farm. The lawyer, the merchant, and any business man expects to work all the year. It occurs to me that farmers can be prosperous if they will give their business the same attention that any other successful business man does.

It is said that sheep growing does not pay in this country. I believe a man who has a ewe which is worth $2.00 and can raise a lamb that will sell at eight or nine months old for $4.00 or $5.00 is making a pretty fair profit on his investment. A man who is raising a two year old steer and can sell it for four cents a pound is not losing anything. What one farmer can do, every farmer can do, but it must have attention. I have this idea, and it is confirmed by going over the State more or less, that farmers do not attend to their business as they should, and as I have said before, there is too much time wasted; the more a man is away from his business, the less he thinks of it.

If one man in a neighborhood can go along and tend strictly to business, and raise cattle and sheep and wheat, and make a small profit on each, and another man, with an equally good farm and ability, fails in doing this, the difficulty is not in legislation, but in not utilizing the means at one's command. And the farmer who succeeds in the future, must understand the changed conditions of agriculture, and where his weak places are, and supply them. The leaks must stop in every direction, and cheap and economical methods of production must prevail. Wheat has gone up 20 cents a bushel, with the same conditions prevailing, and it proves that the law of supply and demand regulates those things. I believe that all manufacturing industries that have succeeded, have succeeded mainly by utilizing, what have been in the past, wastes.

Take Armour & Co., and Swift & Co., they are making themselves rich out of what the farmers and butchers waste because they cannot utilize it. It teaches us this lesson, that so far as possible every farmer shall utilize every means in his power; instead of being discouraged, he should give greater energy to his farming, with the stern determination to come out ahead.

The American people have not gone to the poorhouse yet, and they are not going. When they go, the rest of the world will go with them. Instead of talking of the condition we are in, let us go to work and help each other out.

Thos. Mars: I wish to say for the benefit of my friend Mr. Redfern, that when I was in the legislature, the necessity for a prayer of that kind did not exist. It is a modern prayer. I will tell you the reason why: Friend Ball was in the other end of the capitol the same session I was there.

Now, Mr. Chairman, I heartily endorse what friend Redfern has said tonight; I am pleased with his remarks, and I cannot say that I am exceeding well pleased with friend Ball's remarks, although he and I agree generally very well. But I do believe, fellow farmers, that it is your bounden duty to investigate your surroundings. I know how well friend Ball can talk in regard to the product of sheep, the value of cattle, etc. But he can sell a cotton sheep for wool at any time, when I have a full blooded wool sheep, that I cannot get the price for. The same way with his four cent beef. He can sell one of his Durhams for four cents a pound, when I and my friend here on the right cannot get more than two and a quarter. One just as good, exactly, as the other.

It is the man who has a great deal to do with it. I don't want the farmers to be grumblers, and I don't want them to be looked upon as grumblers, but I do want the farmers of Michigan to stand upon their dignity, and when they are oppressed by other classes of people, I want them to know enough to resent it, and if there is any help to be had, be prepared to insist upon having it, before the legislature or anywhere else under Heaven.

I do not think it is for us to say that everything is all right and smooth and let other people manage the affairs of this country entirely; if a farmer is competent to fill an office, let him do as the politicians do, even if it is going to congress. I think you ought to be prepared to fill an office creditably to yourself and your constituency. If you are competent to be Governor, do as the politicians do—announce your name for the position and don't be backward, and I believe if you take this position the time is not far distant until the farmers will be counseled as to true and honorable measures, as well as any other class of people.

L. C. Root: I wish to make a little plea for unity of action. I wish to urge every farmer here to join some organization so as to work in unity with his brother farmers. I called on a professional gentleman this afternoon, here in Grand Rapids, and he said, "You cannot imagine how much good we get out of our dental association," and he said, "It has long been a wonder to me why farmers do not organize, because they could accomplish so much more," and the gentleman was right, and every farmer who will think about this subject will see that he is right.

These Farmers' Institutes, as we follow them from county to county, show many familiar faces; people who have received sufficient benefit to prompt them to follow them from place to place, and they are receiving benefit which they say is of value to them, far beyond the expense of time and transportation.

But neighbors, and farmer friends, how are we going to reach the majority of the very people we wish to reach with the Farmers' Institutes? You are here from somewhere in the county or State, but how many of your neighbors are not here? How many of your neighbors are at home, and how are you going to reach them? There is just one way to reach them, and that is to take the Farmers' Institute right into your own neighborhood, and you can do this with unity of action and organization.

Now we have an organization among our farmers which has been mentioned here, and it is known as the Grange. Many of you are well acquainted with it, but I am sorry that there are few organizations in this section, in comparison with what there ought to be. Take this organization, which has made it possible for you to gather in these Farmers' Institutes all over the State, which has made possible the gaining of knowledge and information you have had the past winter.

Take these organizations into your own neighborhood; put one in every school district, and then have every man, woman, girl or boy, who is old enough, join that Institute or the Grange; it will cost but little; you can support a farmers' institute, and have a club, a lyceum, and a debating society all in one, and you can have as good an institute every week or month as you have had today. These Granges furnish the key to the storehouse of knowledge. Any man or woman who steps inside the doors of the Grange, and becomes acquainted with the workings, will find a key to fit some closed door in their minds, and which will open an avenue of education that will prove of more benefit to you than these institutes, which you can only attend once a year.

Think about this matter, take it up and go at it in a way that will enable you to reach all your neighbors; just as soon as they get an institute they will be as enthusiastic as you. Talk the matter over and organize.

STOCK AND DAIRY DAY.

THURSDAY MORNING.

HON. WM. BALL, CHAIRMAN OF THE DAY.

ECONOMICAL METHODS OF SHEEP FEEDING.

H. W. MUMFORD, AGRICULTURAL COLLEGE.

Fully realizing the condition of the sheep industry at present and the position it has held for the past three or four years, it is with considerable hesitancy that we shall attempt to speak to you for a few minutes on "Economic Methods of Sheep Feeding." However, when we come to look back over the past and study the history of agriculture and the development of this country, we are impressed with the idea that the sheep has been a most potent factor. We find that many of the most prosperous and wealthy farmers of the United States, and especially of Michigan, have become so largely through their identification with sheep farming, and it seems almost a pity that we should desert those who have been such staunch friends of the farmer, because of some temporary adverse conditions.

There is one thing with agricultural papers that always seemed to me radically "out of joint," if I may be allowed the expression, for we find that when one farming operation appears to pay better than any other, the farm papers at once and with one accord devote the larger part of their columns to that industry, while those industries of the farm which can only be made to pay a profit by observing the most strict methods of economy are almost, if not entirely, crowded out. While, in reality, if ever we should know of the best methods, the methods of the most successful, it is when conditions make it difficult to secure profitable returns for labor and money invested.

It is but justice to the speaker in opening a discussion of this nature to say that different sheep feeders pursue different methods. One man feeds his sheep certain food stuffs in a certain manner and is very successful, and his neighbor may follow slightly or considerably different methods and be equally successful, and when it comes to grains, it is impossible to say that any one grain or fodder is the most economical food ration for all seasons and under all conditions, for we find that much depends upon the relative market values of the different foods.

Then, too, we should not overlook the fact that the food consumed is not the only essential factor which enters into the economical production of mutton. The place they are fed, the sheep themselves and the manner in which they are fed all have a direct bearing on the subject.

BARNS OR SHEDS FOR SHEEP FEEDING.

It might be expected that we would explain and recommend to you some elaborate plan for a sheep barn, but we have not taken the trouble to do so, for we are not in favor of them for practical sheep feeding purposes. They do well enough for wealthy farmers who have the money, but for the average man who is in the business or goes into it to make money it would be utter nonsense to build an expensive barn to feed sheep in. A rough shed placed on high well drained soil, which affords protection from wet storms, will serve every purpose admirably. Of course there is a great advantage in having a shed or barn for feeding so constructed that the coarse fodder and litter, as well as grain, may be stored in the same building. One advantage of an open shed or one put up with rough lumber is that the sheep pens are well ventilated and the lambs are kept cool. I strongly believe that the best results will be secured in fattening sheep where they are kept cool, and yet more or less closely confined. It should be emphasized that sheep must be kept dry. Not only their pens underfoot but also their fleeces. Sheep, and especially fattening sheep, will endure a great amount of cold, if only they are kept dry, without any inconvenience or loss to the sheep.

KIND OF SHEEP TO FATTEN.

Just a few words in regard to the sheep themselves and their relation to economical feeding. Without question, leaving out the western sheep which are frequently shipped in from the west to be fed, the most profitable sheep to raise or buy to feed are grade coarse wool lambs, which are produced by crossing our common, usually high grade Merino ewes with some of the English mutton breeds. And all I care to have to say about the best mutton breeds for crossing purposes at this time is that more depends upon the individual ram selected than upon the breed. Oftentimes there is as much difference between animals of the same breed as between animals of different breeds, that is, from a practical standpoint.

The sheep feeding in Michigan is largely limited to the feeding of these grade lambs, and we believe that as time goes on fewer old sheep will be fed, for the western ranchmen will sooner or later learn that there is more profit in disposing of a lamb before or at one year old, if it has been properly handled, than at any time thereafter. But whether old sheep or lambs are fed, they should be first healthy, and second, early maturing. No attempt should ever be made to fatten lambs if they are not in vigorous health, free from internal and external parasites. In our own experience we have been more or less annoyed by these two varieties of pests in our flocks, and we are satisfied that our neglect to promptly eradicate these pests at times has been a serious menace to our financial interests. It will be only necessary or possible to suggest here a remedy for the external parasites, such as ticks, lice and scab Thorough dipping is a sure remedy.

The most profitable lamb to feed will, other things being equal, be that lamb which has made a steady and rapid growth from birth to the time you get it. Never buy a stunted lamb, even if you can secure it at a seemingly reasonable figure. They never do so well and are but seldom profitable.

HOW TO FEED.

Regularity is one of the first requisites of a good sheep feeder. You cannot hope to be successful unless you are very regular in feeding the sheep. They should be fed at just such an hour each day. If you oversleep and are late about feeding the lambs it means a reduction of final profit. Another qualification of the feeder is that he should be quiet in manner. Never go among the sheep in a careless hurried manner, but always with quiet, careful motion. We have never been able to find a bunch of sheep or lambs which were wèll fattened or doing well which were not tame.

An abundance of pure water should be furnished the lambs, and salt should be either kept before the lambs at all times so that they can run to it at will or they should be salted at regular and frequent intervals; the object to be gained in either case is to let the lambs have what they need of it. We have used both rock and loose salt, and could not say now that either was more preferable. The grain and fodder should be so fed that there is no waste, and in such a manner that all the lambs can get to it at about the same time.

THE SELF-FEED IN FATTENING LAMBS.

There may be individual instances where it will pay to use the self-feed, but we believe them very rare indeed. (For further information in regard to this subject, I would refer you to Bulletin No. 128 of the Michigan Experiment Station.)

RATIONS FOR FATTENING LAMBS.

Generally speaking, corn and clover hay is the ideal and economic ration for fattening lambs, but it is not safe to say that it is the most economical at all times and under all conditions. For example, take it in some sections of the northern peninsula of Michigan, no corn can be grown except some few very early dwarf varieties, and consequently some other grain has to be substituted. In this case peas are substituted. Field peas can be grown very successfully in that climate, and as doubtless many of you know they are a most excellent food for fattening lambs. Oats can also be grown there more successfully than here, and of course are largely fed to other classes of stock. Their main dependence for grain for sheep being the peas.

For four seasons lambs have been fed in an experimental way at the State Experiment Station located at the Agricultural College. Different grain rations have been fed with an effort to find the best ration for fattening lambs. As a result of these experiments we are prepared to suggest the following conclusions:

First, In each instance a net profit was secured. We all freely admit that conditions have been greatly against the sheep industry, many going so far as to say that sheep are kept at loss, etc., and yet we find a good profit as a result of the feeding at our station.

Second, As a rule, those pens which received corn alone, or as a considerable part of the grain ration, made better gains and made them more economically than other rations.

Third, Where roots were fed in the ration, more economical gains were secured as a general thing than where they were not fed.

And just here we believe is a valuable suggestion to us as sheep owners in the United States. We find that earlier in the history of sheep raising in the United States little or no roots or succulent food was fed during the winter season. And we find many who make no provision for such feeding now. Yet we find in England, the home, we might say, of mutton sheep, they depend largely upon succulent food for the ration of the sheep. When we come to import these large mutton breeds to this country, sheep which have become accustomed for years to a diet chiefly of roots, and confine them on dry feed, it is no wonder we do not do better with them. We must fully appreciate the fact and change our method of feeding somewhat if we ever hope to compete with England as a mutton producing country.

SUBSTITUTES FOR CLOVER HAY.

While perhaps nothing is quite so good as well cured clover hay for fattening lambs, yet if we do not have but a small quantity or none at all of this, it is possible to secure good results without it by using other coarse fodders, such as millet hay, corn stalks, oat straw and bean straw.

DISCUSSION.

Q: What about the corn and roots?

Mr. Mumford: I may say in regard to that point that it was a test. The effort in that experiment was to test the relative values of roots and silage and the grain ration. A great amount of silage and roots was fed, and not so heavy a grain ration.

Q: There are a great many kinds of roots, and you have not spoken of any particular kind.

Mr. Mumford: Well, in regard to the kinds of roots, there is very little difference in regard to their feeding value, but as a rule we have fed mangolds at the College, and I have fed rutabagas.

Q: Did you ever try an experiment with carrots?

Mr. Mumford: No, sir; but I believe they would be equally, if not more, valuable for feeding.

Q: I would like to know what price you fix on the roots?

Mr. Mumford: Two dollars and a half a ton.

Q: Do you feed whole grain entirely?

Mr. Mumford: Yes, sir.

Q: I would like to ask what was the difference in cost between wheat and corn?

Mr. Mumford: Wheat was 60 cents a bushel, and the corn was 40 cents. With wheat alone, it costs seven cents a pound to produce a pound of gain, and with corn a little over five cents.

Q: Please state how you came out with the roots?

Mr. Mumford: The roots gave the best results; not enough difference, however, to make any great point of it.

Q: I would like to ask the gentleman if he has had any experience with lambs taken with a hard cough; they run at the nose, and in a short time die, when they were fleshy and well cared for.

Mr. Mumford: Yes, sir; I have had a great deal of experience with lambs being sick in all sorts of ways, and I have come to the conclusion that it is a pretty hard thing to doctor a sheep. They will give up and die about the easiest of any animal I know of. I have tried treating lambs for various diseases, and I only wasted time and medicine.

Q: Is there any difference in that between breeds?

Mr. Mumford: The coarse wools are more susceptible than the fine wool lambs.

Q: How long a time can a bunch of lambs be fed, to profit?

Mr. Mumford: It very much depends on the condition the lambs are in when you commence to feed them. For the average lamb, I think the period of feeding should last from ten to fourteen weeks. When a lamb is fat, that is the time to sell it.

Q: How about the value of rape as a preliminary food?

Mr. Mumford: Rape has been grown successfully, and it is believed from what experience we have had to be a very good food for fattening lambs. More should be grown.

DISCUSSION BY HON. H. H. HINDS, STANTON.

I think the paper of the gentleman who has spoken is beyond criticism, and the lessons to be drawn from it by the practical men who have sheep in this country, are two or three.

First, The sheep needs to be kept dry and warm; he must be kept out of the wind, to be successfully fed.

Second, He must be quiet and contented.

Third, He must be regularly fed and watered.

That is the experience of all successful sheep feeders, I judge, in this or any other market. The feeding of roots, etc., is entirely in the line of good advice. It helps exceedingly in the assimilation of the stronger foods, but it is not always exactly practicable. As a matter of fact, the successful feeders of Michigan have tied securely to the anchor of clover hay and corn. The paper showed that they were right in that. There is a difficulty that confronts us now, in the utter annihilation of the clover crop. Of course, I should say to all farmers disposed to feed sheep, that they need not abandon the field because they canot get clover hay. The sheep, if desirable for any one thing more than another to the farmers of Michigan, is so because he is a scavenger. He is a hustler. He will take what you have to spare and will render some kind of an account for it. You can put him in a brier patch, and he will spoil the berry picking, and make a good pasture there. But the wind and wet must be kept off of him. The difference between the fine and coarse wool in the particular mentioned, is that the fine wool lamb has a better roof given him by nature. You must keep the sheep dry. As the lecturer has told you, the sheep is absolutely without grit. When he gets sick, he lies down and dies. He is particularly susceptible to diseases from exposure.

How are you going to get the lambs?—that is a question. They don't grow on bushes. Our friend has told us where we are going to get them, the grade Merinos and other fine sheep. The grade Merino is the best mother the feeding lamb has, but what are you going to do about it, under the present conditions? If the paper applied simply to the immediate future of sheep in this State, why the immediate future could be settled easily, and probably with the least trouble, by buying a Gatling gun, loading it, and working with it each way through the flock. But we must have a different future for sheep. Michigan and its agriculture cannot, in my judgment, exist successfully without sheep. There is no other kind of stock to take its place, and the best breed of these lambs is the wool bearing sheep. The legislation of this country should be changed in a direction that will make it possible to raise the mothers from which you can raise this kind of sheep. I do not want to talk politics, but I think I will say this.

WILL FEEDING FOR BEEF PAY IN MICHIGAN?

HON. W. E. BOYDEN, DELHI MILLS.

I could answer yes or no to this question and sit down without fear of being contradicted. But I believe this is a subject of too vital importance to the farmers of Michigan. While I feel incompetent to advance any profound truths that are new, or point out any royal road to great profits along the line of beef production, I can perhaps say something that will cause farmers to give the subject some thought. Were other farm products in demand at profitable prices it would seem useless to attempt to argue that beef could be produced at a profit. But after looking over the whole list of farm products I fail to find but one that is selling on today's market at a price that is profitably above cost of production. And this crop is hay. But were we to figure the area given to hay, the yield was so light per acre that I fail to see any profit in it as an average Michigan crop for 1895.

SOIL FERTILITY.

In my mind one of the vital points in future successful farming is soil fertility. If we are to grow anything like profitable crops under present unfavorable climatic conditions, it will be from a soil well stored with available plant food. Were it not for robbing the soil I would feel almost like saying, sell everything from the farm possible and let the other fellow chase the cattle. But we must aim to increase the productiveness of our farms, as right along this line will come a great help in times of depressed prices. Ten bushels of 50 or 60 cent wheat per acre means a sure loss; but 30 or 40 bushels per acre will give a profit. Some will no doubt claim great profit in the use of commercial fertilizers. In fact there are some soils under favorable conditions that return a handsome profit from the application of honestly prepared fertilizers. I have in a small way tried two or three different makes, said to be good ones, but was unable to note any difference in the crops. But think we should all experiment in a small way along this line. I have found one brand that has always given us good results. It is rather bulky to apply but the results have been very satisfactory. It has been called the "Farmer's Friend," "The key to successful Agriculture," and perhaps other names, but is best known in our section as *barn yard manure.* It is many times made up of various things, from broken down farm wagons and tools to our last year's straw hat and cast aside rubber boots. I prefer it made from the droppings of well fed stock mixed with straw.

While Michigan sells but little coarse grain as compared with some western states, she will do well to sell less. We are robbing our farms of from two to five millions each year in what grain we sell. Pause and consider whether we can afford this soil robbery.

THE CONSUMPTION OF BEEF.

Supply and demand are considered the natural laws that govern prices, but it seems to me that the consumption of beef has much to do with its present price. We are confronted with lowering prices right in the face of a shortage amounting to two and a quarter million of cattle as marketed within the last year, which at a low estimate means ten million pounds of dressed beef. I state without fear of successful contradiction that under-consumption is costing us from five to fifteen dollars on each animal over three months of age. Why this under-consumption? Have the people of this great and grand United States found other meat more suited to their taste? No, indeed! For there never has been, nor never will be, any meat that will usurp the place of prime beef in the taste of any civilized people. Why then this under-consumption? Merely from the fact that conditions (which I do not at this time care to discuss) are such that the masses of our people look on meat as a luxury rather than as a necessity. Was it always so? No. Will these conditions continue? It remains for you and me to decide. Would it not be better for every one to try and help bring about such conditions as surrounded our people from 1870 to 1885?

WILL FEEDING FOR BEEF PAY IN MICHIGAN?

I answer yes. Why? Because only along the lines of diversified farming can we hope to succeed. Our population is increasing, our supply of beef is decreasing, and so called hard times are bound to improve.

Then let us go about beef production in a sensible business way, for in no other way can we hope to succeed. Just now the dairy craze is on. This will help the price of beef, because many think there are no cattle except dairy breeds that can produce milk and butter at a profit. This seems to be a mistake, for I have in mind a beef bred dairyman who usually rolls on top, for his name is Ball, who is producing gilt edge butter at as low a cost per pound as any I know of, from cows that are the dams of the making of prime steers. What can be done in Livingston county can be done in Kent county. We must study the wants of our market. In years past he who had three to five year old steers, weighing from 1,600 to 2,000 pounds, was right in line. But today baby beef is on top. And why not? Isn't a tender juicy cut of meat preferable to a lump of tallow?

BREEDING.

This then necessitates a somewhat changed course of breeding. Low down, compact, early maturing cattle are now at the front; so breed that kind. To me it would seem poor taste to attempt to force the good qualities of any one breed on the intelligence of this audience at this time. But, brother farmers, don't attempt to produce first-class beef from second or third-class animals. Better try to lift yourselves by your boot straps. Decide which breed will best suit your requirements, then be content with none but the best of the breed.

With the best of any breed, full success will only come to those who are not afraid to feed. If it will pay to feed at all, it will pay to feed well. By this I mean feed all that the animal will assimilate. Profitable feeding will come along the line of full feeding. The markets of today are bidding top prices for cattle that are ripe at 18 to 26 months of age and weigh 1,100 to 1,400 pounds. How can we produce such cattle at a profit? By using less time and feed. How best to accomplish this is then the question. For the average farmer I would suggest cows that will give 25 to 40 pounds of milk, testing 3 to 5 per cent butter fat. This will pay her way and leave the skim-milk to grow our steers on. By replacing the fat taken from the milk in some way we have a prime food for any growing stock. A good way to replace the fat taken from the milk in skimming is to add ground flax seed, old process oil meal, or other like fatty foods. Give the calf a good start by using plenty of new milk for the first three of four weeks.

CROWD THE GROWTH.

Any animal to grow profitably must crowd forward from start to finish. Any careful thinking farmer can produce steers that at 20 to 26 months should weigh 1,000 to 1,300 pounds, and worth on today's market $40 to $55. Quality from now on will have much to do with the price.

In conclusion, I wish to state that Michigan can and should produce prime beef as cheaply as any state. Have no fear of competition in prime beef from the western ranges, for if the far west wishes to compete at the top of the market she must first grade up her stock, then supplement the range in part with hay and grain. We are then on equal footing with any country. With the return of general prosperity we may look for six cent cattle. How many farmers are there here that are now raising calves that can develop into prime steers? In years past it was no trouble to find from one to ten really good steers on most every farm in our section, but today it would be impossible to get a car load of prime steers in Washtenaw county at any price. From the present outlook it will only be a few years ere many of us will have forgotten what a right prime steer looks like.

With corn, oats, oil meal, and, in fact, all feeding grains so cheap, I see no reason why well bred steers will not return a profit even at the now seemingly low prices. By well bred I do not mean pure bred necessarily, but bred for a purpose. Many times high grades will answer every purpose, except to continue on in the improvement of our stock. But at present prices for well bred cattle no farmer can afford to waste feed on scrub farm stock. We hear the complaint on every side that our brightest young men are leaving the farm. Try interesting them in feeding a few good cattle. It may result in saving a good farmer at the expense of a cheap lawyer, half-fed doctor, or an unscrupulous politician.

DISCUSSION.

Mr. Morton: What would be your opinion as to the relative merits of the Shorthorn and the Angus as to feeding for profit?

Mr. Boyden: Either one will feed with profit.

Hon. H. H. Hinds called for.

Mr. Hinds: I have fed now and then a steer, and once in a while a heifer. I have no doubt, farmers, that as matters stand today, the most profitable place to put your grain is in the well bred steer. I think there cannot be a shadow of doubt about that, and I believe there is no partner you have, in all your field of agricultural operations, who is so nice, so good natured, so thoroughly appreciative of good environment and nice care as the steer. He is a fellow who is different from the sheep in this particular; he wants to be dry and out of the wind, but he will take the open shed, if you give him plenty of corn stalks that haven't been husked. He will take care of them in good shape and do well. Or you may put him in a band box—but it is not always best to turn him out of the band box to the frozen creek—but he will stand even that, if you will give him an extra shock of the corn that is not husked. But it never pays on any market to feed the ill shaped steer. It doesn't pay to feed anything that will not mature before it is three years old.

It is only the nice, well formed animal that it pays to put food into, and there is no animal today which you can so successfully feed as the well bred steer.

Mr. Johnson: There is one idea, which has not been brought out very clearly; taking the different breeds of heifers and steers, we will call them machines. We are putting feed into these machines; now do these people who are in this business not find a large difference in the results obtained? Are there not some animals that will produce a great deal more with the same amount of feed, than others? I would like to have that point brought out.

Mr. Hinds: The gentleman, I don't know as I fairly understood him, but I think he wishes me to advocate breeds. I don't think I will go into the breed question—we haven't time; any well fashioned steer, of any of the beef breeds, you can feed satisfactorily.

Q: Wouldn't it be well to mention the beef breeds?

Mr. Hinds: I don't know as I care to do that. The steer should be fashioned to lay on meat in the best parts. Some are not built that way. Some steers are not meant to be fed at all; I think they were intended to be shot.

Mr. Brown: Have you had any experience in the last few years in feeding corn and cob together, and what effect has it on the digestive apparatus?

Mr. Hinds: I might say that they have been trying to starve Shorthorns to death for fifty years, down in our county, and they haven't done it yet. Practically, I don't know what the scientific properties are, but it did well in our section.

Mr. Giles: I don't want to say anything in particular about feeding ground corn, cob and all, as to feeding properties, but I have a crusher that I have used for six or seven years, for grinding my feed. I feed corn to all of my stock, cob and all, but ground rather coarse—fed it to the cattle, horses, hogs, and hens—as the main thing, and they all did well on it, and I have seen no bad effects.

Mr. Crandall: I have been feeding ground corn for six or eight years. I have a machine that grinds corn and cobs. I am feeding this winter everything on my farm, corn and cob meal. I took a number of hogs, after feeding them corn in the ear, and ground the same amount of corn, and fed it twenty-seven days—giving them just half as much as I fed in the ear, and my hogs succeeded in finishing up their fattening process and made nice pork. We figured it down fine, and we thought we had a saving of 45 cents, which would be a large saving. It is laid down on the authority of some of the experiment stations, that 17% of the fattening qualities are in the cob. If that is true, we can hardly afford to lose it.

I ground up two or three tons at once, and for the first three or four days we spread it out, and then we fed everything. I found in my lumbering that it was an excellent thing. The team steers were fed the same amount of that as of the clear meal, and the horses seemed to do as well with four to six quarts of cob meal as with four to six quarts of the clear meal.

Mr. Geo. C. Monroe: There is one time for selling steers that many miss, and that is when they are four weeks old. We sell in Chicago at that age, and we often get as high as $11.00; sometimes when a steer is a year old, he will not bring more than that. I would like to emphasize the point of giving them milk; give the animal all the milk it wants; we give it sweet milk, and find that it pays.

Mr. Lester: Will you give us the price of those steers, running from the last of January to the first of April? That is one question. There was a gentleman here last night who claimed that Mr. Ball could sell cattle for five cents a pound as quick as he could sell for 2½ cents. Also I would like to ask the best kind of grain to feed cattle.

Mr. Boyden: I don't call those figures to mind now. Last year from the first of January, I think, until the first of April, good cattle were worth from four to five cents, or a little better, in Detroit. They went up pretty fast, along about a year ago now; they thought they were going way up, but the people didn't eat beef enough, I guess. I think about five cents was the top there.

We find that a very good feed for our cattle is to grind the corn, cob and all, and mix some oats with it. When oats are cheap we usually put in a good many oats. Take forty bushels of corn in the ear, and put in about ten bags of oats with that, grind it all up together, and then the more you feed of that, the better they seem to do.

Q: What else have you fed besides corn? Have you had any experience with ensilage?

Mr. Boyden: I might say that I am not prepared to talk on ensilage. I could not speak intelligently about it, because I have never used a pound of it, and still I have some ideas on ensilage. Ensilage is the farmer's best friend. He can raise such large fields of corn. You can raise six or ten tons of ensilage per acre, and a farmer can soon figure that down and find that he cannot afford to mow his land at two or three dollars a ton.

Q: How do you dehorn cattle?

Mr. Boyden: By application of caustic potash.

Wet the top of the calf's head over the horn that you feel when the calf is two weeks old, thoroughly wet that and rub the caustic potash on the spot over the horn, and in nine cases out of ten the horn never starts.

Mr. Ball: In regard to the remark made by Mr. Mars last night. He said that Mr. Ball could sell his steers so and so. Now I have some cattle which are well enough. I have also a native scrub cow, which I paid thirty dollars for. I was offered three cents for the steers, and one cent for the cow. The cow has been fed as well as I know how to feed her. It is not the man who owns the animal, but the animal itself, and I am throwing away one-half to two-thirds of the feed I am giving that cow. The better bred the animal is, the better indications it shows of beef production, and it don't make any difference to the drover who owns the animal.

Mr. Wright: I believe there are others who sell beef at a good price besides Mr. Ball. We have probably one of the best stock counties in the State (Huron). I went down to the yards last fall, and I saw there a bunch of yearling steers; the drover paid $28.00 apiece for them, and made money on them in Buffalo. Those were highly bred cattle.

THE DROUTH.

There being a few moments to spare, Mr. L. B. Rice, of St. Clair county, was invited to present a few thoughts on the above topic, having given it considerable thought:

We never had such a combination of things as we had in the spring. We commenced the spring dry, following a winter without snow, and a dry autumn and fall. We sowed our grain upon dry ground, when the dust blew in clouds. After harvest you found a second crop coming up in your fields because the seeds did not come up at first, and when we got rains later, the grain started and you had a second crop. That was followed by the dry hot weather of June, which seemed to scorch everything up, all over the country. The wisest men of the country looked at each other and said—not "What shall the harvest be?" but "Shall we have any harvest at all?" Your pastures were dried up entirely; your meadows had burned white, and your fields generally looked almost barren. When the harvest was reached in July and August, there was a surprise for the wise. We never had such a harvest before. We never harvested such crops of oats, and corn, and potatoes as this year.

Now what lessons are we to learn from that condition of things? In the first place, our ground was dry, as I said before, when we put in our crops. The root of every plant struck straight down into the ground, and when the dry, hot winds of June swept over the fields, those roots were way down below, bringing up the material necessary to produce the crop. It could not produce long straw, it could not produce tall corn, but it did produce heavy ears. Now we cannot change the condition of things, you say, and make the same conditions occur next year. When there come floods of rain, you cannot roll away the clouds, and let down the sunshine, and dry up the earth, any more than you can call down showers when it is dry.

No, you need not do this. But you can see that the water that does come is taken care of. This is one of the most important points. Just to please myself and to illustrate for some others, I conducted a very interesting experiment. I took two panes of glass and put them about a half inch apart. I filled the space with garden soil, and then planted seeds—planted grain, oats and radishes. I planted them so that we could watch the growth of the roots and see the results. I made two of these, and the one I wet, soaking wet, and the other was so dry it was almost impossible for the seeds to germinate. The one would represent the soaked ground at seed time, and the other the ground as it was last spring. After four days, I gave the dry one what would equal a half inch rainfall, on the surface. After that, as they were kept close by the stove, the wood would get dry, and I would occasionally set it into water so that the wood would not dry out the soil, but would leave it in its natural condition and perhaps make a very little rising of water by capillary attraction in the plants.

What was the result? The plants in the dry earth came up in about half the time of those in the wet earth; that was a surprising thing to me. The plants in the dry earth shot down one straight root, and when the top was broken, and the plant was just beginning to come out, I could see three or four inches of the tap root running as straight down as a plumb line. There was a lesson to me right away. I did not know before that our corn and oats sent down that tap root so far into the ground. What were the other plants doing? A little feeble root struck out this way, and one that way; the top tried to go up, and finally, three days later than the dry one, the wet one came up. In eighteen days I had fine healthy plants in the dry earth; they had grown four inches high and were dark and healthy. The others were two inches high, spindling and looked unhealthy.

There was a lesson, and it reminded me of so many fields I had seen in the spring; the crops were way back and looked spindling and bad. But you see, by and by, when the root gets through the sod, the corn will take on color and look better, and there will be a good crop after all. And I leave it to you as to which plant was in the best condition to stand a drouth, of the two, and produce a good crop. The lesson I wish to draw from this is, that you shall so cultivate and underdrain your soil, that when you sow your crop early in the spring, the first plant growth may be deep and strong, and then you will get a good harvest, no matter whether you get any rain or not. We are not dependent on the clouds to give us rain. Mother Earth is all steaming with moisture, all the time.

PRACTICAL METHODS IN STOCK BREEDING.

HON. WM. BALL, HAMBURGH.

With other business men, the farmer and stock breeder is obliged to be considerate and conservative if anything like success can be looked for in his farming and breeding operations. The cost of his plant, the amount invested in the form of stock, tools, and necessary equipment, are all matters of the utmost importance when looked for results are to be considered.

The amount required for labor, the cost of living, the keeping of stock, must all be taken into consideration. The speculative value in gilt edged pedigrees for thoroughbred stock, unless backed up by positive good results, has become a thing of the past. The real value of an animal today is not whether it is a Bates, Cruickshank, Duke, or Duchess when Shorthorns are considered, but with an excellent pedigree, how much substantial merit there is in the animal when the dairy or the butcher's block shall be used as the test of value. The excitement produced by the performances of the Annes of St. Lambert, or of the remarkable values contained in Stoke Pogis' veins or his descendants has given way to that more practical view that remarkable production has been dependent upon skillful feeding and proper environments as well as that contained in the blood of the animals. The fact has become apparent to practical farmers that a few highly bred and highly fed animals do not represent the practical values in the breed when brought to the test of actual results in the hands of the ordinary careful breeder and feeder.

THE BATTLE OF THE BREEDS.

The thinking farmer is studying the problem of probable profits in stock breeding. The battle of the breeds has been fought so far as the peculiar merits of the breeds were concerned. The results of the fight between the beef breeds have been of intense interest. One year the Red, White and Roan have been crowned with the belt of superiority, while the White Face was a sure winner the next, the Doddy coming in for renown the next year; and so the battle has waged—no one breed a sure conqueror, but all having the elements of superior merits.

At the Columbian Exposition held in Chicago in 1893, the Shorthorn not only won laurels as a beef producing animal, but was high in the scale as a dairy cow, proving beyond a doubt that, as a practical farmer's cow, she has no equal. The proof of this statement lies in the facts revealed wherever and whenever a test in two directions has been made. The persent tendency in stock breeding is in the direction of practical results. The pedigree mania has received a black eye from the fact that beyond honest, careful, and judicious breeding as shown by the recorded lineage, the balance was in the fancy of the owner or breeder, and of no particular value when speculation in pedigrees had ceased.

The vast amount of money squandered in buying red Shorthorns of inferior qualities on account of a prevailing fashion in color, should be a valuable lesson in the future should the color craze again get control of the breeders. The hopes sustained in using bulls with gilt edged pedigrees and a fashionable color in the herds all over the country is beyond credulity. Whether the lessons taught by the hopes sustained will be of value in the future will depend upon the good sense and judgment of the breeder. With the hope and expectation that what I may say will cause a discussion, I am going to state my views as to my choice of cattle as applied to the average farmer. With the knowledge that writers, and others interested in special lines of breeding, scout at the idea of a general purpose cow, I believe that such a cow exists in large numbers, and that all things considered, she is the cow that should receive the most careful breeding and attention to all the details necessary to bring out two very desirable qualities in the same animal, namely: beef requisites and dairy qualities. Such a cow is found in many herds of Shorthorns of thorough breeding, and in large numbers of Shorthorn grades which abound in nearly every state.

DAIRY SHORTHORNS.

The early history of Shorthorns is replete with statistics showing valuable dairy qualities. It was the boast of that veteran breeder of high class Shorthorns, Thomas Bates, that his cows were most excellent for both milk and butter. That the beef qualities in most herds have received in the past the greater attention, is true. It is also true that where especial attention has been given to dairy qualities, success has followed such efforts, and the beef qualities to a marked extent have been retained. The ninety day test made in Chicago proved that the special butter breeds had a strong competitor in every direction in the general purpose cow, the Shorthorn. While I believe that the highest excellence in butter and milk production and beef qualities cannot be obtained in the same animal, still it is true as shown by positive tests that the Shorthorn cow contains, in a marked degree, both essentials—dairy and beef qualities.

The signs of the times indicate that the ordinary farmer cannot afford to specialize in any particular direction from the fact that, owing to his surroundings and previous practices, he is not fitted to compete with those whose education and interests lie in the direction of special farming. As cattle are necessary to all farms for their yields of milk and butter, as well as for beef purposes, it is well that the farmer should select an animal which may prove of value in two directions. Dairying, like most other kinds of business, will be overdone if the increase in private dairies shall be kept up, and it is good judgment that prompts the farmer in mixed husbandry to breed that class of cattle that have proved, and will continue to prove, valuable in two directions.

GENERAL VS. SPECIAL PURPOSE CATTLE.

What has been said regarding general purpose cattle in no way reflects on the value of special purpose cattle. They have their values and their friends, but in this age of keen competition in all branches of business, it is good policy for the farmer to consider the claims made for the different classes of cattle and the basis for such claims, before investing much money in any. It is not the purpose of this paper to discuss theories in breeding. This question has been before the people for many years, and all who wish may be informed on all points from the numerous treatises on stock breeding which everywhere abound. The aim is to call attention to that which may be profitable to the farmer who must make his living and expenses from the profits in his business. Nearly all kinds of domestic animals are needed upon every well conducted farm, and it is very essential that the specimens bred and grown should be of those which are practical.

HORSES.

The same practical utility should be sought in the breeding of all other domestic animals. The ordinary farmer cannot afford to pay fabulous prices for the services of trotting stallions from the fact that so few colts thus bred prove fast enough to bring prices that would warrant the outlay. Such breeding must be left to professionals. Only for market purposes can the farmer afford to breed excessively heavy horses. For farm work and its attendant road requirements, a medium sized horse is desirable. Such a horse can be obtained by using a well bred and well made trotting or coach bred stallion if not too expensive. Such horses are best fitted for farm work. It is the general custom to use three horses abreast for the heaviest farm work, and a horse weighing from 1,150 to 1,250 pounds in ordinary flesh is best adapted for such purposes.

My observation has led me to the belief that a medium sized horse is a longer lived animal than the very heavy horses, and less liable to sprains and injuries. Muscle, power, endurance are all very essential qualities in a good horse. Let specialists pursue their vocation, and the vocation is a necessary one to bring out the highest excellence in any particular direction, but the farmer should breed for farm purposes a horse capable of endurance and fair speed upon the road and good working ability on the farm. In short, he should breed a general purpose horse. No unsound mare of any breed should be used for breeding purposes. She should be free from blemish, and contain, in a marked degree, qualities desired in her offspring.

WOOL AND MUTTON.

Formerly, when the farmer was supposed to have interests that the government should foster in connection with the further manufacture of his products, growing and breeding sheep for wool or mutton was found profitable, and high developments in both directions were obtained. The wool grower could point with pride to his valuable flocks of Merinos that had cost large sums in money and time and study to develop. They were his finished product. And when the fleece had been taken from the bodies of his sheep and put into form, it became his manufactured product. This was sold at remunerative prices to the manufacturer who changed the form of the farmer's manufactured product into cloth, which being sold to the tailor, was again changed into coats, pants, vests, hats, etc., which men and women wore. All these different manufactures were protected from foreign competition by law and on a fair basis. The people desired a change; they have it.

Members of the Merino Sheepbreeders' Association, only about one hundred and five or six, have kept up their dues, and you can get a glimpse of the conditions surrounding wool growing in the United States. What is true of the Merino breeders is partially true of the mutton breeds. Their sheep are constantly depreciating in value, and the cry is going up for a general purpose sheep, one good for both wool and mutton. I am of the opinion that if any sheep can be made profitable under the present circumstances, it may be the general purpose sheep. I am also of the opinion that the change the people asked for has been sufficient for reasonable people and the nearer we approach to the year 1897, the more the wool bearing Merino will appreciate in value from the fact that such a demand will be made for another change, and that the markets of this country will not be the free dumping places for the cheaply produced wool from every quarter of the globe. The general purpose sheep, like the horse or cow, has come to stay, and may help bridge over the chasm which will last for the next two years. To the Merino breeder I would say, don't dispose of the best of your sheep. Breed them pure and keep in mind the old motto, "Improvement in all directions." It will pay. Fashions change as well as prices. It looks now as if the bottom prices for wool and mutton had been reached. A return to better prices is in sight. The United States should raise every pound of wool needed for consumption. This means more than double the number of sheep ever grown in this country. No country is better adapted to wool growing and mutton production than the United States. No other country contains so intelligent a class of people and so well calculated to bring wool growing and sheep breeding in general to its highest development. The practical side of stock breeding in this country seems to be in the direction of practical results. Values now are not inflated by speculation. The performance of all domestic animals will be the basis from which values are to be received.

DIVERSIFIED FARMING

must, as a rule, be followed. The breeding and feeding stock must be an important factor in keeping up the fertility of the farms, in furnishing motive power for farm operations, in furnishing plenty of milk and butter, wool and mutton, pork and lard, eggs and poultry, and it should be the most practical of its kind.

It is unnecessary for me to say to you stock men that feed is as necessary as breed in the propagation of good animals, that one cannot succeed without the help of the other. All successful breeders recognize this fact. One of the important things to be learned is what to feed and how to feed it that the best results can be obtained. The loss sustained in not knowing what kind of feed is best, and in not feeding it judiciously, cannot be accurately estimated, but it is enough that careful attention to the matter should be given by every breeder who expects to make a success in stock breeding.

I have endeavored in this paper to call attention to matters affecting stock breeding that seem to me to be important. I have advocated the breeding of what I call general purpose animals, because I believe the most money lies in that direction to the average farmer and breeder, and partly to call out discussion.

DISCUSSION.

LED BY H. GAYLORD HOLT, CASCADE.

I find nothing to criticise in Mr. Ball's paper, but feel like impressing upon the minds of the audience the good points. The paper was written by one who has tested by practice what he preached to us this morning. But were I to begin breeding any of the thoroughbred sorts of cattle or sheep or swine, I would fix in my mind an ideal animal of the kind, whether for beef, general purposes or for dairy, and so on; then having fixed my ideal, I would work up to that ideal just as fast as possible, and I would have a uniform herd of cattle, sheep, swine—even of poultry. This is not so easily done with horses. Few of us live to breed many generations of horses, but with cattle it is easily done. Many of us, perhaps most of us, occasionally raise a horse or a colt, and in doing that I should always breed from those that are perfect, and as the paper said, as near as possible to the size and conformation of the ideal. Then I should feel that I was quite sure of making a success of my undertaking. With cattle or sheep or swine, the matter is by no means different. After having selected my ideal, my model, and trying to work up to it, for the herd, I should keep for my motto, "Uniformity." I should do this for my own satisfaction, and because I believe that a herd of cattle, uniform in color and make up, I care not what the breed, would not only be a greater satisfaction to me, but be more remunerative.

In buying, where I find the same color and form in a herd, I say to myself, "If I buy three or four heifers here, I know pretty nearly what I am to get. I will pay more money for them, but I will be better pleased in caring for them." I would carry that rule all through my stock breeding, if I could have my way. I would select from the same family, if possible, and I would carry this clear through all the stock on the farm—clear down to the hens.

In regard to the feeding of stock; Mr. Ball has referred to that. He says the breed alone will not fill the bill; they must be properly fed. I believe this. Take a colt and feed him grain and the best hay the first and second year, and he will always be a fat horse, with decent usage, and I believe the same thing is true with a calf. Grow it the first winter, the second winter feed it a little more, not overloading it, but grow it as rapidly as possible, and you will always have something nice, if it was nice to start with.

Mr. Clark: Mr. Holt's idea is correct. He desires a uniformity of herd, and if he commences at the bottom round and follows that up, he is making a distinct strain or type, and he can form a new herd of cattle, and call them, if you please, the "Gaylord." That is the way such a thing is done.

Now, with regard to the paper of my friend Mr. Ball. I take some issue with him in regard to his process of breeding. How can he get his general purpose animal? It is only by selecting male and female of a distinct breed, and crossing it with a distinct breed of some other kind. He must also have his ideal, the same as my friend Mr. Holt, and in so doing, you must not argue against the breeding of pure stock, for only by means of the pure stock can you form the general purpose animal.

Mr. Ball: I am glad Mr. Clark brought out that idea of breeding for symmetry. The general purpose cow is to bridge over certain circumstances. What the farmer wants of her is a cow that is good for beef and for milk, but of course that cow will not be perfection in either direction. My practice would be to make selection from grade Shorthorns. The Shorthorns include both requisites as beef and milk producing cattle. The Shorthorn is capable of producing both results. I am convinced that it is a good thing for every farmer who will feed well, to breed what is called a general purpose cow.

I believe in selecting for uniformity too, but it should be uniformity of excellence. If I go to Mr. Clark's herd, and find a row of cows of excellent dairy type, and found that they were all excellent yielders, then I would not stop to ask whether they were colored like Brown Bessie or not. If I wanted to breed cows for a business, I would go into a herd that had uniformity in business qualities. We all believe in that, but it ought to be emphasized on the record.

Mr. Holt: That was what I meant to advocate. I would not take a heifer from a herd just because they were all colored alike. Of course I would look for the good qualities—my ideal cow.

Mr. Morrill: I am today a rank outsider in any discussion of this kind, but I have been engaged in this business in years gone by, and I do think Mr. Holt's ideas are worthy of careful consideration. I told you that the ladder of fame is a long one, and there are many at the bottom and very few at the top, and the top must be a pleasant elevation for those who get there, but the breeder who produces the pure bred stock is the man to whom we have to go for improvement. That man should have an ideal. In some herds we find the man's brain working at cross purposes. He is trying to do something and does not know how. We go into other herds where a man has a clear ideal, and has good practical judgment, and he will get there; he will succeed .

You will find many popular breeders among the Shorthorn men. One man knows how to breed a Shorthorn that fats up smooth, another produces one that fats up lumpy, and in the wrong place. The idea of color, size, and similarity is very valuable, but you must make your selection from other qualities as well.

THURSDAY AFTERNOON.

THE DAIRY HERD—BREEDING.

MR. J. H. BROWN, CLIMAX.

A dairyman in going into the business of making butter should have this point in view, to breed to one cow or a herd of cows that will produce the greatest amount of butter in any one year or during one period of lactation. The first question I am usually asked is, what breed of cows will do this? That is a hard question. With what experience I have had, I have found that some of the scrubbiest scrubs would lead the Jersey and Guernsey in this production of butter fat. Do not understand that I claim that the scrub is better than the thoroughbred. It depends on a man's standard of excellence. It isn't all in the pedigree, but a man in breeding a dairy herd must have in view the environment of his cattle, and the feeding, housing, and water, and those little things which we often do not think of as essential.

One of the best helps we ever struck in trying to breed a dairy herd, was in using a pair of scales, a Babcock milk test, and a sheet of paper and a pencil. There is no man, I don't care who he is, who can breed and keep his herd up to a high standard of excellence unless he has these four things. He must have a record of some kind and occasionally review what he has been doing, and know where he stands.

THE STANDARD OF EXCELLENCE

for butter makers is this: If we have a herd of scrubs, native cows, and we have to breed up from what we have on hand, our object should be to fix in mind a certain standard of excellence, and bend all our energies in making the feeding and environment tend toward that result. Unless we do this, we are breeding in an indiscriminate manner. The man who is breeding up stock and doesn't know what he is doing, might far better be out of business. More than one half the cows that are giving milk, where the product is made into butter, I believe are not paying for their board. I think I would even be safe in saying that two-thirds are not paying for their board.

A few of the principles in breeding which I was taught were, first, that like begets like. Take a certain cow, a native cow or a Shorthorn cow, and breed her to a male of the same grade without any points of excellence, we are not improving our herd. Consequently, if we use only native stock to breed up, we must see that our sire is just what a sire ought to be, in order to develop the qualities in the progeny of this cow or a herd of cows, so that ultimately we will have the cows that will furnish the largest amount of butter product. Those cows, which by test, and a careful record of the amount of butter made in one year, are found to be the ones to breed from, should be chosen. We bred from a

Jersey, because we believe that ultimately we could produce the largest amount of butter from a Jersey herd. I have since modified my ideas somewhat. I believe the Guernsey is about as good as the Jersey; but no matter what stock we select from we must get a sire that has a good record. In looking over a certain animal's pedigree, we must look to see that the dam and grand dam, four or five generations back, have a record. The sire is more than half the herd, and if we can get such a sire as that it will be worth while to pay a good price for it.

Some farmers, instead of making their selection from a breeder's herd, where the animals are known to be of superior merit, will go to another farmer who has a Jersey to sell which is not a Jersey at all; it has been bred and inbred and bred to scrubs until all the Jersey there was was in the looks. There are lots of such so-called Jerseys, and they are a disgrace to the farmer who keeps them. There are no points of excellence about them, and they are no good for anything when you get through milking them. If you are going to breed Jerseys, don't stop and talk with the first farmer who has a scrub Jersey to sell, but go to a breeder who knows what he is about. I want to emphasize this one point of buying sires or calves or heifers from men who ought to be prevented from offering such stock for sale.

THE BABCOCK TESTER.

Then comes the Babcock tester. I will explain its work later. It has been the greatest help I have had. Cows which I supposed were first-class butter producers I found to be the poorest cows I had. This Babcock tester reduced our seven cows to three that were good producers. We got a Jersey sire, and kept on buying for a year or two, and we have to buy occasionally now, but as soon as we get one the Babcock tester tells us what to do with it. We have now a herd of fourteen cows that will produce 275 pounds per year each, and I hope by next April will produce close to 285 or 290 pounds of butter for a year's record. I cannot say whether they will reach that limit or not. Our cows are mostly grade Jerseys, but they have been bred to a certain point of excellence. After we keep a cow one year, if she won't make 250 pounds of butter she goes. We hope, after a while, to obtain cows that will produce 300 pounds of butter in a year. The first year our herd only averaged 185 pounds of butter. It costs $35.00 to keep a cow a year, about that. Now if we can't get $50.00 worth of butter and skim-milk from this cow, and count in the calves, she isn't worth keeping.

A GOOD COW IS A GOOD COW.

There is one other thing in connection with this breeding, and it touches the technical line of breeding, too. I have found out that a good cow is a good cow all the world over, no matter of what breed. We have in our herd a Shorthorn cow that has been bred from a cow my father got 27 years ago. That cow was of a dairy type, and he took particular pains to breed her along that type. We have now two cows that we are milking which came from that original cow, and which this year will make over 280 pounds of butter in a year. We have today in our herd two cows that will beat all the others, and they are Shorthorns. It is because those cows have been bred along the dairy line.

There is another little thing that comes in this connection. We made a mistake in selling one cow last year, simply because we didn't understand her. We milked her a year, and she didn't produce the amount of butter we thought she should, and we sold her. For some reason she didn't produce last year, but this year she is beating the record. We tested her occasionally, weighed the milk night and morning, and here is the point we should look at. No cow, during a period of years, will produce the same each year. Don't always judge from one year's record. It is by looking after all these little things in breeding, that we farmers can hope to improve in whatever stock we have.

DISCUSSION.

LED BY MR. AARON CLARK, MIDDLEVILLE.

I quite agree with the paper that has been presented. I can only supplement the statements already made. Of course now there is a theory connected with breeding. This gentleman has given us the practical results of a theory. Years ago we had theory without practice, you remember, and book-knowledge became a by-word, but today we have a practical class of experiments; but they are based upon theories.

I take the position that when you want an animal to perform a particular function, you must breed in that line. You must form your model the same as the breeder of the race horse did, as the breeder of the draught horse did, keeping distinctly in that line, and always breeding up to your model. The time will come when there will be no general purpose horse, no general purpose animal, no general purpose cow or sheep. As my friend said, they may be used to bridge over; that is all right, but you must always bridge in the line of your model. How did he get his Shorthorn milch cow? I am a great admirer of Shorthorns, and there was a time when they were demanded, when people demanded a cow that would produce both milk and beef, and the Shorthorn was a grand good cow. But the men breeding for beef took the Shorthorn and bred her in the line of beef, until the world says they have bred the milk out of her. They are doing that, if they have not already done it. Why? Because they have a demand for that kind of animal, one that will, from the least amount of food, produce the most flesh, and that is right; they have gone in that direction and neglected the dairy interest, the dairy properties of the Shorthorn, and produced an animal that is par excellence as a food animal. Now this gentleman has stated that he had one or two Shorthorns. There are many Shorthorns that are good milkers yet, but the type of the Shorthorn is the type of the beef animal. Wherever they gain in beef properties, they lose in the dairy. The rule is made—no man can serve two masters—either he will love the one and despise the other; and a man cannot serve two masters in the dairy world, or the beef producing world, any more than in the moral world.

In my opinion, the dairy is the coming interest for the farmer to engage in.

All over the State of Michigan men are beginning to learn from the experience of others that there is money in dairying, when properly conducted. But if you embark in the dairying interest, you must go into it a level headed man, and not try to serve two masters. You must select a model and work up to it. There are certain animals that my friend here, who is a beef producer, has stated to you were dairy breeds. In the islands of the English channel, where land is scarce, the cow became the main support of the family. It was taken charge of by the wife and daughter, and made almost one of the family, and here comes in his theory of kind treatment. It was taken into the very household, treated kindly (and there is no animal on the face of the earth but which, if treated right, will serve his master and return compensation for what is given). You have got to raise dairy men and dairy maids, as well as a dairy herd, before you can get cows that will perform as the cows of the Channel islands perform for those who love them, and express their love by proper food and care and kindness and gentleness and housing.

What was the native animal that you propose to make the general purpose cow? You remember it, as it ran wild. Two were kickers, three hookers, five jumpers, and three had perhaps three teats, and the other two, two teats. You turned them out upon the commons, didn't you, and if you had a pony, you sent a pony with a boy, because the boy couldn't run fast enough. You milked them when the gad flies and insects were prodding them, and the hired man, who had worked all day plowing, was mad clear through, and the cow didn't act just right. Now then, the cow didn't give any milk, did she? An animal must be used right, in order to compensate the owner for the food and care given it, and it will do it every time. When you get a theory and a practice together, you are on the high road to success.

The people of Canada have long been producing cheese. They ship direct to the old world. Some of you know of the cheese industry in Canada, where the markets are set apart for cheese, and the farmers have bent their energies in the direction of producing good cheese and of obtaining a profit from their cows, and they have had wonderful success.

I have said that the dairying interest, however, is the coming interest in Michigan; but, how to go at it. First, select your model; take a native cow if you please or a Shorthorn, and you have learned this, that when you buy a cow of your neighbor, and he selects the cow, you get the poorest cow he has. You have learned that you would rather give a higher price and have your own selection. A dairy cow has certain peculiar marks, which designate her as a good cow; all of you claim to be judges of a dairy cow; in ten years you will be better judges, and you will all agree upon what is the model for a dairy cow.

Know what your cow is doing. Many farmers say, I have say seven cows, and they are doing well. Do you know, gentlemen, that out of those seven cows, five may have been excellent producers, and two almost worthless, although the best producers of milk? Now come your appliances to test the butter fat—your scales to weigh the milk, and your test. You have got to do that, and the man who is judicious will take his Babcock tester with him, and will test the quality of the milk, instead of the quantity, and then if you get quantity and quality combined, you have a cow upon which you may rely, in this process of breeding.

Mr. Lester: I want to ask this audience, how many there are here who have a Babcock tester? About one in a thousand. I also wish to ask Mr. Brown a question. How long do you propose to have those cows go dry?

Mr. Brown: We try to have them go dry four or six weeks; some are persistent milkers, and won't. We always advocate our cows going dry two months.

My friend Clark gave us a nice talk here, but I told him there was one thing he ought to have said, "Go slow." In this dairy matter, you want to go slow. Which is the largest dairy—the one that is producing the most butter in the United States today—isn't it Armour & Swift, over in Chicago? Probably two-thirds of the families is this city are using butter from Armour's dairy. Will it pay us to buy Babcock testers and test our cows and sell them off at half price because they don't happen to fill the bill?

That is the trouble; go slow before you get into debt for Jerseys. It is all right for a man to go into these things, but there is one thing a man wants to do—he must like the business he is going into.

THE DAIRY COW—FEEDING AND CARE.

PROF. C. D. SMITH, AGRICULTURAL COLLEGE.

To treat properly this important branch of the general discussion of the dairy cow, in the time allotted me, necessarily limited, is, of course, impossible. I shall therefore attempt nothing more than to outline a few general principles and emphasize several details which seem to me to be of especial importance at this time. Concerning the usefulness of tables of food analysis and of the theoretically balanced ration, I have no time to speak, important as these topics are for discussion.

It may be well to remember at the outset that the cow is a machine, and, more than a machine, she is a living animal. Her function in the farm economy is to convert such forage and grains as the farm may produce into milk, butter and fertility. It is well in this great State, so completely given up to grain raising, to recognize the dairy cow as an important factor not only in increasing the wealth of the State, but in restoring to the soil its pristine fertility. The dairyman who would make a living, and at the same time maintain the fertility of his farm, must not only know how to feed cows to produce a profitable yield, but he must know in addition how to so compound his rations as to purchase the food stuffs which will best supplement the crops he raises and will bring on the farm the fertilizing elements which the soil needs. If he raises corn, timothy hay, oats and wheat, both from the point of view of the greatest yield of milk and butter and the maintenance of soil fertility, wisdom will dictate that he should purchase oil meal, cotton seed meal, pea meal, or wheat bran, because these foods, besides being rich in those food materials which are lacking in corn, timothy hay and wheat straw, contain the nitrogenous elements and ash constituents which will aid him in enriching his fields. No dairyman can therefore expect to succeed who is not a good all round farmer, blessed with nature's greatest gift, common sense.

The successful dairyman will remember that his best dairy cows are not the product of nature alone, they are the final results of centuries of breeding; they are not cows in their natural condition. they are abnormally developed and hence are abnormally sensitive. The highly bred cows which give him the greatest and most profitable yields are, on account of this abnormal sensitiveness peculiarly liable to lose the qualities that have been bred into them through the centuries to make them most valuable. By the law of breeding, universal and well known, they tend to revert to their natural condition. The first general principle then should be that if we would maintain and elevate the present high standard of our best dairy cows they must be fed and cared for according to the dictates of their changed and abnormal natures. and not according to the nature of an undeveloped animal.

WELL BRED COWS MUST HAVE CARE.

In nature a cow is bred with the ability to resist hardships; by art those hardships are removed. and hence the energies which, in the natural cow are directed to a thick coat, strong neck and big horn, are now diverted to the production of milk and butter. By nature a cow consumes but a moderate ration; by art her capacity is increased threefold. By nature she yields but a small mess, and that for a short time; by art her daily yield has been increased ten-fold and her period of lactation indefinitely protracted. Now I repeat that it is the constant tendency of the highly developed modern dairy cow to lose these qualities bred into her by art and to revert to the original state of small capacities; and it is the business of the dairyman to prevent this reversion by protecting the cows from winter storms, by furnishing constantly good feeding and care from one's year end to another. and by careful and thorough milking to keep up the yield.

Protection from the winter's storms is given for the purpose of making the animal comfortable and to allow the food to be devoted to the production of milk that would otherwise be required to keep the animal warm or make it possible to endure hardships or discomfort of any kind. The attempt must be made to keep the animal under conditions at which she can do her best. What are these conditions? We notice that the largest messes are yielded by cows usually in the month of June. This suggests that it might be wise to attempt to continue the June conditions throughout the year.

VENTILATION IN THE STABLES.

We know as one of the most important of these June conditions that the cow gets plenty of sunlight and fresh air. The temperature seems a little too high, and as we watch the cow quietly chewing her cud on the hot days she gives us evidence that to be perfect for her the weather ought to be just a little cooler. It is my observation that the most highly civilized cows enjoy best during the winter the temperature between 40 and 50 degrees, and we try to keep the cow stables as near that temperature as possible. Disease germs have no worse enemy than sunlight. My ideal cow stable, therefore, would have the ridge pole run due north and south, and would provide accommodations for two rows of cows facing each other on the east and west sides of the central feeding alley. The windows would be large and frequent on either side, admitting an abundance of morning sunlight from the east and afternoon sunlight from the west. The walls would be thick and packed with sawdust or straw to exclude the cold, and a free access of fresh air would be permitted at such convenient points and in such ways as to admit an abundance without creating too great a draft. The problem of ventilation, however, is far from being settled. The importance of this daily sun bath cannot be exaggerated, and it is my firm belief that the presence of tuberculosis in so many closely housed and highly bred herds is to be ascribed very largely to the exclusion of sunlight from the stables. Do not try, therefore, to economize lumber by building your barns round or in any other form which does not permit a daily sun bath when the days are cloudless.

CLEANLINESS.

To keep the cows comfortable and at the same time clean is one of the difficult problems which confront the average dairyman. This is a question of stable fixtures. There are two kinds of cow stalls which I desire to commend. The first is called after its inventor, "The Hoard Stall." I describe it briefly and leave it to your ingenuity to construct it with such modifications as your own requirements may suggest.

Let us assume in the first place that the floor is level. Erect on either side of the feeding alley, and in front of each row of cows, a tight board vertical partition, 4½ feet high. Twenty-two inches from the floor on the side of the partition next the cows nail on a two-inch horizontal plank one foot wide. This is to serve as the bottom of a slanting, slatted rack, into which the corn stalks or hay is to be placed. For the top of this rack fasten a 2x4 on a level with the top of the partition and 2½ feet distant from it. Nail slats four inches wide and six inches apart from the two-inch plank which was placed twenty-two inches from the floor to this 2x4. When the cow is now brought in she is tied to a ring in the center of the stall, fastened to the plank which constitutes the bottom of the feed rack. When the cow stands up the slant of the rack forces her to stand well back. When she lies down she can lie under the slanting rack and well up towards the partition in front of her. To compel her to do so a 2x2, or perhaps 2x4, three feet long, is spiked to the floor in front of her hind feet. In front of this 2x4 the bedding is placed. The droppings will fall to the rear of it. A box to contain the grain feed or silage is pushed through a hole in this tight partition in front of the cows and is thrust well back into the stall. It may be removed when the cow has finished eating. Partitions extending from the hind feet of the cows up to the 2x4, to which the slanting four-inch strips are nailed, and which makes the top of the slanting rack, should be erected between the stalls, which should be three to three and a half feet wide, according to the size of the cows.

I have seen this style of stall in successful operation in several places in the State. In each case the cows were perfectly clean. The other kind of stall is patented, and for that reason I hesitate to recommend it. It is called the Bidwell stall, and you can obtain full directions for its construction of Porter Bidwell, McGregor, Iowa. We are using the Bidwell stall on the College farm, and I have to report that the cows are comfortable and at the same time perfectly clean. We must remember in this connection that absolute cleanliness of flank and udder is necessary for the production of the highest quality of butter, hence I recommend the adoption of some such plans for keeping the cows comfortable and clean as I have suggested.

THE FOOD.

Concerning the feed of the cow, time does not permit me to say much. Let us remember that the cow should never get hungry, and that our profit comes alone from generous feeding, from the excess of food furinshed over the amount required to maintain the life of the animal. Let us remember, too, that it is a wise policy to feed what the farm produces and to purchase those things alone which are needed to fitly supplement these articles.

In the southern part of the State at least, the corn crop must be at the basis of nearly, if not in every, profitable ration which can be suggested. Well cured corn fodder, properly housed and judiciously fed, is one method of utilizing the corn crop. The silo is another place into which the corn crop can be profitably stored. I have fed corn silage for many years and can commend it to every dairyman who will intelligently fill his silo and intelligently feed its contents. I know of no more economical and in every way satisfactory method of handling the corn crop than placing it in the silo. But this subject is to be treated at length later in the program and I need make no further mention of it here. I cannot pass this phase of the subject, however, without emphasizing the necessity of utilizing the entire corn crop, including the stalks, to the utmost. For this reason I recommend that the corn be cut as soon as it is thoroughly glazed and while the stalks are green and succulent. I recommend that it either be placed at once in the silo or that it be securely bound in large shocks with as little exterior left to the ravages of the weather as possible. Save and utilize the entire corn plant. Experiments west and east of us have shown that in these northern latitudes one-half of the feeding value of the entire plant rests in the stalk.

The silage of field cured corn fodder should be supplemented with an abundance of grain feed. The question often comes to the station whether it pays to feed grain to dairy cows. I invariably reply that if the cow owner has any doubt on the point give the cow the benefit of the doubt. The cases are few where it does not pay to feed an abundance of grain judiciously to milk-giving cows. Feed nearer the upper limit than the lower.

Our experience at the College with cows of both the ordinary and extraordinary kinds leads me to believe that the results of feeding a large amount of grain are two-fold. In the first place, an immediate financial return comes from the increased amount of grain fed in the similarly increased yield of milk and butter, which more than compensates for the increased outlay. Here the knowledge of the chemical constitution of the grain feeds is indispensable to success. The feeder must understand the materials he is using and must combine them wisely. His financial success will depend on the two factors, knowledge and judgment of the desires and capacities of his cows, and knowledge of feeding stuffs and their proper combinations. With a grain ration wisely compounded the more he can get his cows to eat of it, in combination with cheap and effective coarse fodders, the greater the immediate profit. In the second place, a close observation of the constantly increasing yields of cows from year to year that are continuously well fed compels the belief that there is a residuary benefit from such high feeding, and that instead of the cow being "burned out," surfeited and spoiled by it, she is improved and rendered capable of larger yields and more economical.

I have abundant evidence to support this point in the records of the cows of the College herd. I need not refer to them here in detail. It is sufficient to say in this public talk that wherever we have fed a cow up to her capacity, she has increased her milk and butter yield the following year and has made the increased yield with equal food economy. The point is a very important one since the belief is not limited to a few farmers in the State that it hardly pays to feed grain in the first place, and secondly, that the continuous high feeding of the cow ruins her future usefulness. I will admit that when you approach the upper limit of the capacity of the cow, you must proceed with caution and must exercise more skill than when you feed more lightly, but the profits are also correspondingly greater as well, and in these days of close competition the dividing line between profit and loss on the herd may be in the grain bin.

The question of

WHAT GRAIN TO FEED

is also a live question. The selection of the grain feed must depend upon the coarse fodder already on the farm. The wise dairyman will raise as much of his grain feed as he possibly can and will purchase such supplementary grain feeds as he must to make his ration palatable and effective.

For this reason I suggest, for the northern part of the State at least, that more peas should be profitably grown for stock feeding. If sown deep, say from three to four inches deep, in sandy or loamy soils, which are especially adapted to the crop, and put in early in the spring, they may be cut for hay early in the season and furnish a most excellent and useful forage. We sow two bushels to the acre of peas, plowed under four inches deep, and a half bushel of oats drilled on the surface later, for this purpose. If allowed to ripen, the peas, when ground, furnish a cow feed nearly as rich in protein as oil meal, and most excellent to feed with silage or timothy hay.

Clover hay is, in my opinion, the best single coarse fodder for milk cows. The animals are very fond of it and its chemical composition is such that it forms theoretically almost a perfect ration alone.

A RATION.

For a thousand pound cow in full milk a ration of eight pounds of corn meal, six pounds of wheat bran and all the clover hay the cow will eat is suggested, to begin on. Increase the amounts of the grain feeds as long as the increased yield pays for it. Then stop. With such a ration some roots may profitably be fed. I fed roots extensively to a large herd of cows in the early '80's, but the tender recollections of the frequent backaches attendant upon their culture has prejudiced me against them since. Rather than raise roots for the succulent fodder I would certainly rig up a silo. With silage and clover hay both on hand, the dairyman is well fixed for the best and most economical feeding. With oil meal cheap as it is today, its use ought to be greatly extended in this State. A ration like this is almost perfect: Corn silage, forty pounds; clover hay as much as the cow will eat, usually five or six pounds; roller process bran, eight pounds, and oil meal, two pounds. Or substitute pea meal for the oil meal if on hand. Silage is weak in protein, the very element in which clover hay, oats, bran, pea meal, oil meal and cottonseed meal are strong, hence the advisability of the mixture. So we might go on all day suggesting mixtures and rations, but we desist.

Love your cows, study them, supply all their wants, never neglect them, feed high, keep warm and comfortable in the winter, and supplement poor pastures in the summer with proper forage. Obey these rules and you cannot fail to reap a financial reward for your toil.

DISCUSSION.

LED BY L. J. RINDGE, GRAND RAPIDS.

I don't profess to be much of a farmer, but it was my good fortune in 1866, for sixteen years, to travel in western Michigan, and during that time, I had opportunity to observe the great waste in coarse fodder on the farm. It was not properly taken care of. It should be cut up either with the shredder or silo, and grain added with it. That produces a manure that they tell me is better than anything the farmer has ever found to put on land. Our lands through this country have been exhausted too much, and are too poor, and many of them have got to change, or we will have a big State that cannot produce anything.

I would like to speak of the stable. At first I put up the old fashioned stanchion, and then I changed to the stall that Prof. Smith has spoken of—the model stall. I have been using those now two years, and they work to perfection, and I get a large per cent of milk, over any other method.

I agree with the Professor that you can't have a cow all dirt and milk her and expect to keep the milk clean, and we must have the proper housing for a cow. I make a warm stable. I found it necessary in my stable that is 9½ feet high, and 50x70, to put in three ventilators, running through to the roof and coming down near the ground, to draw the cold air out. The cold air settles and the warm air rises, and when I used to go in the stable, before the ventilators were added, my legs and feet would be cold; but the ventilators did their work, and it is all right now; you can't put your hand on a cake of ice and keep yourself warm. These ventilators give us a fine temperature; when you can't light a match on the side of your stall your barn is not perfect.

I have found ensilage to be the cheapest food I could feed, and that taking care of the corn in that way was really the cheapest. Plant it as you do your ordinary corn—let it mature until it begins to glaze, and then put it into your silo.

You can grow more tons to the acre if you sow it on rich land and cut it without an ear on it, but one bushel grown the way I have described is worth three of the other. It is bulky any way, and you can't afford to put up three bushels to only get one.

Q: How do you raise it?

Mr. Rindge: In hills, the same as other corn. It may do well enough in drills, but it is sure if you put it in hills. You are sure to get all nature can put into it.

Q: What variety do you use?

Mr. Rindge: I would recommend any variety that will ripen in the place where you live. I have found that straw cut up and mixed with grain makes a nice food. I have found that I could get a great deal out of straw such years as this, when I couldn't afford to buy hay.

There is one thing I haven't heard mentioned, and that is something I have learned that when you have a large cow as a milch cow you have to support a large frame that don't do you any good. And then as regards feeding, they tell us to feed lots of grain, and don't be afraid to feed it. I say, feed lots of grain and don't be afraid to feed it until the cow begins to lay on fat. You must stop then, or you will get a fat cow and little milk.

I am in hopes that our farmers will not leave their manure to leech away. On a good sized farm your manures are worth $300 a year, and yet it is allowed to waste, until there isn't $100 worth. Business men learn these things, because if they don't learn them, the sheriff has a case in a little while. The manufacturer learns these facts, because if he doesn't manufacture as cheap as the other fellow, the other manufacturer gets away from him.

Now it is really a pity that it wasn't so among the farmers, that they would either have to do their work right, or make place for some one else. But such is not the fact. They will stay on a little farm and eke out a miserable existence, while they might as well be working 300 days in the year and have the work accomplish something, if they would only try and see what they can do. The proper time for a man to dairy is in the winter time, and not have a lot of cows taking a lot of time, when the press of work is the greatest. Then, too, they will save all the manure. They can take care of the cows at that time, because they haven't anything else to do, and they can take good care of them. Get good animals, and be sure they are right before you get them.

Q: Has anyone had any experience in feeding beets?

Mr. J. H. Brown: We fed our cows 24 pounds per day; it works all right so far as the cows are concerned; I think it takes a little longer to churn the butter, and also there is a frothing of the cream in the churn.

The cream will ordinarily thicken up in the churn. But this way it is a little more stringy.

Q: Is there a flavor to the butter?

Mr. Brown: I have not noticed it.

Q: What effect in producing fat?

Mr. Brown: We have not gotten far enough along with that to give any reliable statement from our own experience. Others have fed it with considerable success.

Mr. McNitt: Last summer my son had no grass, and when I visited him I expected to find his cows all dried up. When we got there, I said to my son, "Henry, how are your cows getting along?" "Never better in the world; I hope, as far as I am concerned, it won't rain in two months. We are making more butter than we ever made before and of good rich quality. We sell it to the first firms in Muskegon, and get the highest market price." "How do you do it?" I asked. "Last spring I planted two acres of Evergreen corn close to the barn, on rich soil."

THE BABCOCK MILK TESTER.

J. H. BROWN, CLIMAX.

The tester has come to stay. There are other methods of testing milk, butter and cheese by which the approximate amount of butter fat may be obtained, but the Babcock process is far ahead of any common practical method by which the average farmer and dairyman may quickly and cheaply find out just what he is doing. For accurate results the operator must of course become skillful in following all the minute details.

APPARATUS.

The centrifugal machine, pipette, test bottles for whole milk, skim-milk, buttermilk and cream must be properly made and the bottles and pipettes be accurately calibrated. The tester should be well made, of good material, with the head well balanced, so as to insure a perfectly steady motion when turning the crank. If there is much jarring the machine will soon be pulled to pieces, and even the operator is in danger when manipulating the crank.

The speed must be uniform and run from 700 to 1,200 or 1,300 revolutions per minute, according to the size of the head which carries the bottles in pockets around the outside. Those machines having a large head or wheel—say 20 inches in diameter—need not run so fast as one from 12 to 15 inches in diameter.

We prefer a machine run by cog gearing to ensure the speed being kept up to the required limit all through the run. On account of the noise produced by the gears, we use in our own creamery a machine in which the motion is transmitted by rubber friction rings. The adjustment is carefully looked after so that there is no danger of slipping.

GET A GOOD MACHINE.

Do not buy a cheap machine. It does not pay. Get a good one while you are about it, and buy of a reliable manufacturer. A good machine should have a pan or jacket surrounding the head and bottles. This helps retain the heat and also protects the operator in case of an accident from a broken glass bottle full of hot acid.

The pockets around the head should be suspended by a hinge joint so that the bottles may assume a vertical position when at rest, and a nearly horizontal position when under full speed. This is necessary in order to secure perfect separation of the fat by centrifugal force, and also that none of the contents of the bottles may be spilled when the machine is suddenly stopped.

Be sure that all the bottles selected are accurately calibrated. The leading manufacturers of dairy and creamery supplies furnish bottles guaranteed to be accurate. There are thousands of whole milk bottles sent out that vary as much as 0.3 of one per cent in their calibrated neck capacity from 0 to 10. This space in the neck contains, in a perfect bottle, exactly two cubic centimeters.

The milk pipette should be so calibrated that it contains exactly 17.6 cubic centimeters up to the mark above the bulb. The sulphuric acid graduate should be marked to contain 17.5 cubic centimeters.

TAKING A SAMPLE FOR TESTING.

Be very careful to secure a fair sample for making a test. If you are testing whole milk see that the sample taken represents as nearly as possible the whole lot of milk taken from the cow to be tested, if an individual test. It is more satisfactory to test the sample while warm from the cow, but just as good results may be obtained after waiting some time, if the precaution is taken to thoroughly mix the milk so that the cream is broken up and the whole mixture appears homogeneous.

Samples that are fresh, or nearly so, may be well mixed by pouring two or three times from one vessel to another. It is more difficult to secure a correct sample when the cream has coagulated or become dried, and too much pouring or stirring when in this condition is liable to churn the cream.

As soon as possible after mixing the sample the pipette should be inserted and the milk be drawn up into the tube above the mark by sucking. Quickly remove the pipette from the mouth and firmly press the index finger of the right hand over the upper end of the tube to exclude the air.

Now comes a particular job. Have the test bottle ready and hold the pipette up in an upright position with the mark on a level with the eyes. See that your finger end and also the end of the pipette is dry, in order that you may prevent too much air getting into the tube when you slightly raise your finger to let the upper surface of the milk lower to the mark on the tube. Be sure that you have just the right amount of milk in the pipette when the lower end of the pipette is inserted in the neck of the test bottle.

Hold the test bottle in the left hand, also slightly inclined so that the milk will run down the side of the neck of the bottle. This lets the air escape as the milk goes in. Wait a second or two for the pipette to drain, then blow out the last drop before removing from the bottle neck.

Our plan is to throw away the first sample drawn into the pipette from each lot of milk, the second sample being used, if exactly 17.6 cubic centimeters are indicated when the pipette goes into the test bottle. This may make but a slight difference, but it helps secure that accuracy so essential to a perfect test for butter fat. When we made our first tests we practiced for some time in taking samples of water with the pipette. It was quite difficult to secure a perfect sample of water, but by some practice we readily succeeded.

ADDING THE ACID.

The most important part of the work is done when a correct sample of milk is placed in each test bottle. The sulphuric acid may be immediately added and the test completed, or several days may elapse before this is done. When this is done and the milk becomes coagulated, the curd should be broken up before adding the acid.

Be sure to use fresh acid, if possible, having a tested specific gravity of 1.82 to 1.83. Add 17.5 cubic centimeters to each sample of whole milk. This is approximately using equal portions of both milk and acid. If there is a slight variation in the amount of the acid used, of the above specific gravity, it will not materially affect the result.

When the acid is of greater strength, or too much is used, the fat itself is attacked. If the acid is too weak, or not enough used, the casein is not all held in solution during the process of testing.

WATER TO BE USED.

We use rain water, whenever possible, and have it boiling hot. When we have used well or hard water it usually makes more or less difficulty in reading the per cent of fat with the accuracy required. The carbonate of lime in hard water sets free more or less carbonic acid, thus causing considerable foaming and bothers the correct finding of the top of the fat column in the bottle neck. Hard water, however, may be improved by boiling.

As soon as the acid is added, by turning into the bottles, held in an inclined position, so as to run down the side of each bottle, the contents must be shaken gently with a rotary motion. At first there is a precipitation of curd from the milk, but this soon dissolves. A large amount of heat is involved by the chemical action. When the whole contents change to a dark brown color the bottle may be placed in a pocket of the tester head.

The test must now be completed as soon as possible. A tester having an even number of bottles is to be preferred. Place the bottles in pairs in the head so as to maintain an equilibrium during the whirling process. Place the cover on the jacket and whirl with a steady, even motion for at least five minutes, keeping up the required speed given in the directions sent out with each machine, of whatever pattern.

We add hot water twice to the contents of each bottle, but many add the water but once. We fill up to the neck the first time, then whirl for a couple of minutes, adding hot water the second time to reach about the seven per cent mark. After whirling for about two minutes more we are ready to measure the fat. Much care must be taken in adding the hot water with the pipette in order to prevent an overflow.

Measure the fat immediately when through whirling. By so doing the fat is more liquefied and the line between the acid liquid and the column of fat quickly assumes a horizontal position when the bottle stands upright. Sometimes in cold weather we stand the bottles in a can of hot water, immersed to the upper line of fat in the necks.

The reading is best taken by means of a pair of dividers or compasses, measuring the column of fat by placing one point at the bottom; the upper point is moved by the screw adjustment until it correctly marks the upper limit of fat. The dividers are then removed, and, one point being placed at the 0 mark of the scale on the bottle used, the other will point to the per cent of fat in the milk examined. The difference between these gives the per cent of fat directly. The reading can easily be taken to the half division, or to one-tenth per cent. The line of division between the fat and the liquid is nearly a straight line, and no doubt need arise concerning the reading on this point, but the upper surface of the fat being concave, errors often occur by reading from the wrong place. The reading should be taken at the line where the upper surface of the fat meets the side of the tube, and not from the surface of fat in the center of the tube, nor from the bottom of the dark line caused by refraction by the curved surface.

Q: What does the outfit cost?

Mr. Brown: You can get an outfit for $2.00 or $31.00, but it is better to get four or five bottles, and by the way, I know of many communities where two or three farmers have banded together and gotten a large tester. But that must be in a progressive neighborhood; if not they will have a fight before the year is up.

MAKING GOOD BUTTER.

G. H. TRUE, AGRICULTURAL COLLEGE.

What I shall have to say in regard to making butter will be with reference to making butter on the farm. And at the beginning it should be noted that nine farmers out of every ten, and I don't know but more, will find more profit in patronizing a good creamery than in trying to make their own butter. I think better butter can be made on the farm than is made in the creamery, but in a vast majority of instances such is not the case.

In too many cases the so-called farmer's butter is worth no more than the very low price which it generally brings upon the market. It is too often like the butter a little girl brought into a store in St. Johns and said that she would like in exchange for it five cents worth of pepper and the rest in good butter.

CLEANLINESS IN THE STABLE.

If we are to make good butter the greatest care must be taken that the strictest cleanliness be practiced in all the details of the work from the cow to the butter tub. So the first point I would emphasize is cleanliness in the cow stable. The cows should be kept dry and clean so that no particles of dust or other filth from the cow shall fall into the milk. The milk should be carried from the barn as soon as milked and not allowed to stand and absorb the stable odors. We strain our milk into the cans through two thicknesses of cheese cloth.

Then care should be exercised in the feeding of the cattle. Musty hay and grain will taint the milk, and certain feeds, such as ruta-bagas and sometimes silage, give trouble. When roots or silage are fed the precaution should be taken to feed them after milking.

SECURING THE BUTTER FAT.

The next point that claims our care is that of getting the butter fat or all of the cream as we generally express it, out of the milk. There are three methods of doing this of which I shall speak; first, the old shallow pan system which our grandmothers used; second, the cold deep setting process used by our fathers; and third, the centrifugal separator of the present generation.

The butter fat which we are after, exists in the milk in the form of very minute globules, so small indeed that if you were to count the globules in a single drop of milk, at the rate of one hundred a minute for ten hours a day it would take two weeks to count them. These vary in size, and in the milk in which the globules are the largest and most uniform in size, they rise to the surface most rapidly and the separation is most complete.

When a cow is fresh the fat globules are largest and they increase in number and decrease in size throughout her milking period. This is why the cream rises so slowly on the milk of strippers and why it takes so long to churn in the fall and winter when the cows have been giving milk a long time.

Then as the fat globules decrease in size the other solids in the milk increase in amount, making the milk serum in which the globules float thicker and more viscous, thus increasing the difficulty of separation still more.

Then again there is supposed to be in milk a fibrin similar to the blood fibrin which causes the clotting of blood. This fibrin forms a network of meshes in the milk as it cools and its formation is favored by slow cooling and agitation of the milk. As the rise of the fat globules is in a degree hindered by this formation of the network of fibrin the advantage of setting milk where it will cool rapidly and without agitation becomes apparent.

SET THE MILK SOON AFTER MILKING.

So the first point to be observed if the cream is to be raised by setting in shallow pans or cold, deep setting, is that the milk should be set as soon as possible after milking in as cool a place as possible. So far as my experience goes there is no advantage in letting milk stand in cold deep settings longer than 24 hours—but 36 is better for shallow pans, so long as the milk does not sour.

If the milk is separated by means of a centrifugal separator there is no better time to do it than when it is fresh from the cow. If the milk has become cool, however, it should be warmed up to about 86°.

The advantages of the separator are that there is less loss of butter fat in the skim milk, the cream is of a uniform consistency, less tank room and ice are required and the skim milk is in the best possible condition to feed the calves.

I have no doubt that in every hundred pounds of skim milk from shallow pans there is enough butter fat to make a pound of butter. By the use of the separator practically all of this loss is saved.

HANDLING THE CREAM.

In whatever way the cream is gathered great care must be exercised in handling it. The small lots of cream which have to be saved till we get a churning should be kept as cool as possible and should be stirred every time a new lot is added. When enough for a churning has been obtained, remove to a warm place or heat up to from 60° to 65° and allow to stand for twenty-four to forty-eight hours to ripen. If you are in a hurry, a little good sour milk or buttermilk may be added as a starter. The purpose of allowing the cream to stand at this warmer temperature and of adding the starter is to induce souring, or ripening as it is called.

There are several reasons for ripening cream; we get a better flavored butter; we get a more exhaustive churning; less butter fat is lost in the buttermilk, and it does not take so long to churn.

Then there are reasons why the temperature of 60° to 65° is best for ripening. Milk sours as a result of the growth of minute germs in it; the acid which makes the cream sour and gives the butter its flavor is a by-product of their growth. There is no less than twenty different forms of bacteria which produce acid in milk, and numerous other forms are probably always present. By experiment it has been determined that those forms most favorable to good results in butter making thrive best at the temperatures named. At low temperatures there is danger of the bitter fermentation, while at higher, slimy and other objectionable changes are liable to occur.

As soon as the cream is ripe, having a pleasant acid taste, and thick in consistency, it should be cooled down to a low temperature for churning. Churn at as low a temperature as possible and have the butter come in a reasonable length of time.

The point is to have the butter come at a low temperature. In summer I would churn cream at as low a temperature as I could get it, and in the winter I would not churn it above 56° or 58°.

The richer the cream the less butter fat there will be lost in the buttermilk and the sooner the butter will come. Cream from cold, deep settings should therefore be churned at higher temperatures than thick separator cream.

STOP CHURNING

when the butter is in the form of small granules the size of grains of wheat, and when they float well up out of the buttermilk. Draw off the buttermilk through a hair seive and wash the butter in the churn. If the butter has come at a low temperature one washing in cold water (about 50°) will be sufficient to remove the buttermilk.

We ordinarily salt on the worker but if one has plenty of time I would rather mix the salt thoroughly with the granular butter in the churn and then work but once after allowing the butter to stand in the churn from a half hour to an hour.

WORKING THE BUTTER.

The less butter is worked the better, so long as the salt is evenly distributed through it. If the butter is salted on the worker it should be worked twice, the second time after the salt has had time to dissolve.

We of course color our butter and weigh the butter and salt so as to always have it uniform in color and salt. This is a very important point.

Care should be taken in packing the butter to have the packages neat and full. A neat looking package goes a good way toward selling what is within.

Deal promptly with your customers whether private customers or commission men. Let them know that you may be depended upon to furnish a uniformly good product which is always delivered on time and you will not want a market and a liberal profit.

DISCUSSION.

Q: Where can I get a perfect thermometer? They vary.

Mr. True: You can get them of the Creamery Package Company, of Chicago.

Q: How sour should the cream be?

Mr. True: I like to have the cream thick, so that as you drag a ladle through the cream vat, the cream will follow it. It should look like paint, with a slightly yellowish tinge. You know how paint will follow the brush.

Q: Do you let your cream set still?

Mr. True: No sir, we stir it; the heavier settles to the bottom, and the air gets into the cream. A great many tight vats are used, and when you take the cover off, there is an odor. Gases are formed in the cream during the ripening, and I like to have these gases pass off, so we stir the cream occasionally. The cream ripens faster at the bottom than at the top.

Q: What temperature would you take to churn at half an hour?

Mr. True: It depends upon the milk. You canot lay down rules; you can state the principles and conform to them as nearly as possible. We churn somewhere between 56 and 60 degrees, and our butter will come in thirty to forty minutes. Sometimes we may churn an hour, according to how ripe the cream is.

Q: When you churn one full day, what then?

Mr. True: I think I would stop and wait until next day.

Q: I find that the thermometers vary from one to six degrees. Is there not some way to test these thermometers?

Mr. True: Have a standard thermometer to compare them with; we have one at the College. You might have one in a community.

Q: What should be the temperature of the water used in washing?

Mr. True: We use 50 degrees.

Q: How much salt?

Mr. True: An ounce to a pound, and if your customers want more, put in more.

Q: What manufacture would you recommend?

Mr. True: We use the Diamond Crystal. I don't know as there is any better; it is manufactured at St. Clair, Michigan.

Q: Have you used any of the granulated salt manufactured at Manistee?

Mr. True: No sir, I have not.

Q: What kind of coloring do you use?

Mr. True: Chris Hansen.

Q: Is there anything unhealthful in coloring?

Mr. True: No sir; it is not all pure vegetable matter, but there is nothing harmful there.

Q: Wouldn't half an ounce of salt keep butter well?

Mr. True: Perhaps, but we don't want it to keep; we want people to eat it up as soon as possible.

Q: Suppose you undertake this coloring, and the neighbors get jealous of you because you are getting a better price, and report you to the Dairy and Food Commissioner; wouldn't you be liable to have trouble?

Mr. True: No sir, coloring is perfectly legitimate, morally and legally.

Q: In setting milk in pans, at what temperature would you keep the milk?

Mr. True: As cool as possible. Get it down to 40°, if you can, or below 40°.

Mr. ————: The best dealer in Muskegon furnishes earthen crocks, all gallon crocks, and they are weighed and marked, and every individual who makes butter for him has to put his name on the crock every time.

Q: Can oleomargarine be made healthful?

Mr. True: I know the popular reply is, no; but I would rather eat some oleomargarine than some butter.

Q: What about a churn?

Mr. True: Get a churn without any contrivance inside of it. A barrel churn is as good as any—a barrel, box, or swing churn; the dash churn is out of date; it will be used by many people until they die, but I hope their successors will not use them. The best butter is not made in a dash churn.

Q: How much butter ought a cow to make in a day or a month?

Mr. True: It is according to how much her feed costs. But I think if I were starting out, I would want a cow to make a pound of butter a day. A good rule to start with is that a cow ought to make 200 pounds of butter a year.

THURSDAY EVENING.

THE MICHIGAN EXPERIMENT STATION.

PROF. C. D. SMITH, AGRICULTURAL COLLEGE.

The Michigan Experiment Station, which is connected with the Agricultural College, is my topic. Under the federal act granting an appropriation of $15,000 per year for the stations, it is our duty to perform experiments of interest to agriculture, our duty to publish reports of those experiments, and our duty to send those reports, free, to every citizen of the State who applies for one.

On the other side of this same subject, let me say that you also have certain duties to perform in connection therewith. One is, to receive these bulletins, to send us your name, that we may put you on the permanent mailing list. Then it is your duty to read the bulletins, and to write to us any suggestions, criticisms, or interesting points you may know, any special application of the matter contained in the bulletin, any point we may have missed, or anything of that kind, whereby the scientific appliances at the College may be useful to you. And it is your further duty to come down occasionally to see us.

Now what sort of experiments do we try? In the first place, all our experiments relate either directly or indirectly to agriculture. Don't let the idea enter your head that we try experiments on purely scientific lines, not related to agriculture. We have, for instance, a chemical department. When one hears the name chemical, the idea at once presents itself that there is something the ordinary man cannot understand. When you have heard Dr. Kedzie tomorrow, you will see that though he has one of the brightest minds in the State, he can adapt himself to your understanding and mine, who are not chemists. If he were to exploit himself in learned formulæ, it would not do any good. He has taken up such questions as wheat—which he is going to discuss tomorrow—the kind of wheat we should raise in this State, and why. That is what the chemical department is doing, such work as that; it is scientific, but what is scientific? Every man who sees an operation of nature, watches it, and draws an inference from it, is a scientific man. Don't get the idea that a scientific man is one who has graduated from a college; a scientific man is one who observes correctly and draws conclusions from what he sees. Every farmer is a scientific man, if he thinks about what he is doing.

The chemical department takes up the subject of soil chemistry and soil physics, and we will issue bulletins in relation to this topic that will be of interest to every farmer, and every person agriculturally inclined, in the State.

Then we have a horticultural department. It is nonsense for me to stand up here and talk about these things; there is every one here knows

Prof. Taft, and has read his bulletins, and the bulletins from South Haven.

We have other departments that I shall not stop to name. Last, but perhaps not least, we have the farm department itself. We are interesting ourselves in questions of live stock; we are laying especial stress at present upon the dairy and the care and handling of milk. We are going to issue a bulletin which will cover pretty nearly the whole ground of handling the milk from the time it leaves the cow until the butter is made and packed. I am sure that you people who are interested in "cowology," will be interested in that bulletin.

In conclusion, let me dispel from your minds the idea that these men are hyper-scientific men; the men who perform these experiments are practical men in the lines along which they are experimenting. The only way we can experiment in butter making, is by making butter. It is not scientific milk, but cow's milk. We feed cows and we have men that take care of the cows, who are enthusiastic cow lovers, and we feed the cows as you feed them at home, with this addition, that we weigh all the food and watch closely the results.

We hope in addition to that, to do a great deal of work on the bacteriological side, which will be purely scientific, and the results of which will only be intelligible when they reach the results of the results.

It is our province, ladies and gentlemen, to serve you, and we are trying to do it by studying the problems which surround us. Here is something we can ask no man; what do we do? We go to old Mother Nature herself, and ask her the question, and she gives us the answer in the growing crop or the behavior of the animal. You perhaps cannot afford to take the time and money to try the experiment yourself, but Uncle Sam furnishes the money with which it may be done. This Experiment Station is a gift from the General Government to the State of Michigan; we take not one cent of Michigan, except such as the Government derives from import duties, and taxes on whisky and tobacco.

THE BOILING POINT.

PROF. P. B. WOODWORTH, AGRICULTURAL COLLEGE.

At the Michigan Agricultural College there is an attempt made at teaching physics as a leading branch of agricultural engineering. This question is often asked us, "What part can physics play in agriculture?" I wish to answer that question in part only by giving you a sample class exercise. To accomplish my wish this evening I am to play that this is my class room and you are my students. The subject for the morning is to be "The Boiling Point." Physics, together with most of the scientific subjects treated at the Michigan Agricultural College, must be presented in a new manner. We cannot follow any text book, because there are none written to meet the demands of the agricultural student. We have to cut our swath in a new field, without even a rail fence to go by. We always ask and think we deserve your friendly criticism.

MY EXERCISE.

Young men, this morning I am pleased to call your attention to the boiling point of water, usually marked at 212 degrees Fahrenheit or 100 degrees Centigrade—under certain conditions. The conditions and variations are the peculiarities to be noted. Here (exhibiting) is a glass flask, through the sides of which we can observe the action of the water and read the temperature of a contained thermometer. Over the flame one of the first things noticed is the formation of bubbles on the bottom of the dish—top side of bottom. One by one the bubbles begin to let go, start for the top, but collapse on the way up. If we listen we notice the collapsing of the bubbles produces a peculiar sound. This sound has a technical name. It is called the "tea kettle singing." A brisk fire makes this singing period very short, because the bubbles begin to reach the surface. At the surface no noise is produced. Bubbles rise and explode at the surface. The water is now *boiling.*

The temperature has been rapidly rising, but now at the instant the bubbles begin to explode at or above the surface, the temperature comes to a standstill. The temperature is now 210 degrees Fahrenheit on an accurate thermometer, and independent of the intensity of the flame the temperature will remain 210 until the water has boiled away.

Boiling water is largely used in operations, directly and indirectly, at the farm. In the State of Michigan the temperature of boiling water seldom varies more than one degree more or one degree less than 210, Fahrenheit. This would lead one to think that 212 degrees, as usually marked, was wrong. Two hundred and twelve is right for the sea level, because a temperature of 212 is necessary to force the bubbles to the top at sea level. But in Michigan we are about 1,000 feet above sea level; the air is lighter, pressure less, and only 210 degrees is required to send the bubbles to the top. If the mouth of the flask is partly closed so as to imprison part of the escaping steam, the pressure is raised and at the same time the temperature of the boiling water. A handkerchief placed lightly over a flask's mouth will often raise the temperature 10 degrees.

The raising the temperature by raising the pressure has several important applications, one of which is process canning, without sugar or other preservatives. Fruit does not keep because of the presence of germs with Latin names; these germs are not killed by the introduction to the temperature of 210 or 212. In fact, about 300 degrees is required to deal death to the germ. So the fruit, corn, tomatoes, peas, etc., are preserved in water by hermetically sealing after being placed in a steam boiler, where the pressure approximates 40 pounds to the square inch, which corresponds to the temperature above. I have prepared a table to show the relation of temperature and pressure.

BOILING POINT.

Boiling point, water, Deg. Fahrenheit.	Barometer inches.	Pressure, lbs. per sq. inch above a vacuum.	Altitude feet above sea level.	Remarks.
32	.18	.08		Temp. at which water boils and freezes.
100	1.94	.95		
126	4.	2.		Temp. milk is condensed.
150	7.69	3.78	35,000	Glaislus altitude in balloon.
175	13.45	6.60	20,740	Approx. height, Alaska Mountains.
185	17.16	8.37	14,649	
190	19.13	9.40	11,799	
194	20.82	10.00	9,579	Altitude, Quito, S. A.
200	23.59	11.80	6,304	
202	24.58	12.00	5,225	Altitude, Denver, Col.
205	26.11	13.50	3,642	
208	27.73	13.70	2,063	Max. altitude, Michigan, Porcupine mountain.
210	28.85	14.12	1,025	
210.25	29.	14.21	834	Altitude, Michigan Agricultural College.
210.5	29.15	14.28	754	
211	29.42	14.42	512	Altitude, Detroit, Mich., 578.
211.5	29.71	14.56	255	
212	30.	14.7		Sea level.
212.5	30.30	Steam	—261	
213	30.59	gauge	—511	
222.4	36.90	3.3 lbs.	—6,000	
230.5	42.34	6.3		
244.3	55.08	12.3		Temperatures and pressures used in process canning.
250.2	60.65	15.3		
275.7	92.66	31.3		
300.8		53.3		
337.8		100.3		

An examination of this table shows why water boils at 210 here. Levels run over the railroads show that we are about 1,000 feet above sea level, and then we know the average height of the barometer is 29 inches, and if we were to go up higher the boiling point would keep getting lower. A temperature of over 200 degrees is necessary to properly prepare almost everything we are in the habit of having boiled. Glaisher went up in a balloon to a height where water boiled at 148 degrees. He would have had a hard time preparing a boiled dinner. On the high mountains, people resort to various schemes to raise the boiling point so that they can boil meats or steep tea; one is placing salt or soda in the water, another is that of using a tightly fitting cover so that the kettle is in reality a small steam boiler. It is said that they set the safety valve on such cookers to correspond to the age of the chicken. Another application of change of pressure is in one of the sugar preserves—it represents one of Michigan's industries, the condensed milk. Milk cannot be successfully boiled down to a temperature of 210 or 212. Experience has fixed the boiling point for milk at 128 to 130 degrees. Boiling at this temperature would be an easy matter 8 or 10 miles above us. But at Lansing they accomplish this result by use of an air pump connected to a closed pan. Fifteen thousand pounds of milk is placed in a pan and it is made to boil furiously, yet at any time one could place his hands in the pan without discomfort. Usually in three hours they drive off 12,500 pounds of water, leaving 2,500 pounds of milk, to which the sugar is added. Undoubtedly this is destined to be one of great Michigan's greater industries. One factory in Lansing paid farmers $19,000 cash for milk in month of December, 1895.

In closing, I wish to say it was not my purpose to instruct or amuse you, but all along I have had in view asking you this question, "Will such a presentation of my subject educate boys away from the farm?"

At this point Mrs. H. H. Hinds, of Stanton, read an essay, which will be found in subsequent pages. See index.

THE FOREST PROBLEM IN MICHIGAN.

DR. W. J. BEAL, AGRICULTURAL COLLEGE.

Within the recollection of some of us, most of our State was yet covered by a virgin forest such as few portions of the world ever produced. These beautiful trees could not be spared because they grew just where the farmer wanted to build his house and raise his grain. Even at this day of the State's existence, I am somewhat reluctant to speak on the forest problem. It needs considerable courage to stand before you in this capacity, when I am certain you would much rather hear others speak on some such live topics as cows and insects. These things do not interest you now. It takes a tree a long time to grow. We are inclined to leave that for our descendants to wrestle with. But I am impelled to call your attention to one phase of this topic, viz.: Forest fires. My eye falls on this one sentence in the Northwestern Lumberman for January 4, 1896: "Without question the time has come when more care than has hitherto been taken should be devoted to the preservation and better utilization of our forests." Is this statement possible—right here in western Michigan, the home of the famous white pine, numerous oaks, elms and maples? Yes; for our lumber yards are already being invaded by whitewood from Tennessee and yellow pine from Georgia. Let us use our own timber and not import it; but let us look around at our supply. Perhaps there may be something worth considering after all in this word of warning.

CUTTING THE TREES.

I have not a word to say against the man who cuts the best trees from his land—not a word. They grew to be used. It would be next to impossible to keep this timber very much longer, even if the owners wished to keep it. I am familiar with some of the perils of the lumberman. The danger from high interest on the investment, the enormous taxes put on the land owned by non-residents, induce them to log off this tract during the winter regardless of the price of lumber and get what they can out of it. Everything down to six inches in diameter goes, and the land is expected to grow up to brushes, the rubbish will soon feed the flames and in many cases the land will revert to the State for unpaid taxes. What I have to say concerning the forests is said with the view to help the lumbermen and not to hinder them. We have so long been accustomed to the present mode of getting what we could out of the forests, that few persons realize that any better way is practicable, even if it were desirable. The forests have been in nearly all cases treated as a mine, to be cut off till exhausted and then use the soil for other crops or abandon the land altogether. In very many instances this should not be the case. The burden of my talk is in reference to preserving the small young trees which already have a fine start. It will not be long before such will be valuable, in fact they have a prospective value after the larger trees have been removed. No other product of the soil of the State or United States begins to compare in value with that received from our forests, and yet we are leaving the subject to the speculators or the business men who are interested in little else than getting their money out of the timber. The State is interested in the future of the forest as well as in the present.

FOREST WARDENS NEEDED.

We have a set of officers to look after the protection of game in our State. We have a fish commissioner empowered to replenish the waters of our lakes with young fish. I doubt not it is a valuable investment for the State. We have laws to compel men to remove peach trees affected with the yellows or plum tree affected with the black knot, or to destroy canker worms which strip the leaves from apple orchards. But what are we doing to enhance the value of our forests for the future? From one-fourth to one-third of the money value of the crops taken each year from the soil of the United States is derived from the forests. Considering its paramount importance, Michigan is doing nothing in this direction of saving the young trees, yet she is peculiarly adapted to growing timber to perfection, and, in my opinion, large areas of our State should be continually kept growing trees. So far as caring for their forests are concerned, other states all about us show more enterprise—true, it is scarcely more than ten years since the first one of them, New York, began systematically to organize a department for preventing forest fires.

Maine, New Hampshire, Massachusetts, New Jersey, Pennsylvania, New York, Ohio, Minnesota, Wisconsin, Kansas, Colorado, California, are undertaking more than Michigan in the preservation of young timber. In Pennsylvania and in New York the people have organized state societies, each of which publishes a very creditable sheet devoted to forestry. Several states have a system of fire wardens who are to prevent fires or extinguish them when one is started.

In 1887 the legislature of Michigan ventured to appropriate one thousand dollars to defraying the expenses of a forest commission, but in a streak of economy (?) the legislature of 1891 repealed the act. To support a system of fire wardens would cost the State a little something. Will it pay, or had we better continue as we have been doing in the past? Shall we leave the whole to the judgment of the people in each neighborhood? Let us see if a commission could not save to the State every year more than 100 times its cost. If that be the case, and I think it is, it is folly to delay longer. It is criminal neglect to withhold the payment of a tax of one dollar, if by its use one hundred or more dollars could be saved.

COST OF FOREST FIRES.

By forest fires in 1894, the State of Wisconsin lost by estimate $5,000,000 in trees and other property, not to mention the fearful loss of over 400 lives. To help the people in the burned districts at least $2,500,000 was expended, making a loss of at least $7,500,000 in one year alone. The people of Wisconsin have acted and voted means to maintain a system of fire wardens in connection with a forest commission. Minnesota, after sustaining fearful losses of trees, farm property, and human lives, decided to try what virtue there was to be derived from a forest commission. She has voted means to defray the small expenses of a few men to see if something cannot be saved from fires. In 1894 Michigan experienced great loss from forest fires. I am sorry to say I cannot give the exact amount. It would probably reach $2,500,000.

New Jersey, Pennsylvania, California, and other states, have likewise been fearfully devastated by forest fires. They have legislated to prevent some of these fires. Prussia and some other countries of Europe long ago passed through the stage we are now in. Their forests were burned, they organized and have succceeded in preventing most of the losses since such organization.

During ten years of experience New York has succeeded in saving many times the cost of her forest commission. H. D. Ayres, in the Minnesota Horticulturist, estimates, to the best of his judgment and that of others, that 40 per cent of the wooded portions of Minnesota was burned over in 1894. At that time the State was making no systematic effort to prevent forest fires. Prussia, with her present system of protection, in one of the dryest seasons, only permitted six-tenths of one per cent to be burned over. In estimating the loss which occurs by forest fires there are at least two other very important items left out of the account, viz.:

The destruction of young trees from one to thirty or forty years old, many of which have a fine start towards producing valuable timber, and the disastrous effect on the soil. A severe fire destroys a very large per cent of the organic matter within the soil as well as that on the surface. This valuable material, which is the result of decaying vegetation for hundreds of years, may largely be destroyed by the fire in a single day. The loss to the State by the two items last named far exceeds the loss of other things usually named. We should organize and secure means to dispel ignorance and arrest and punish the careless and the vicious.

OUR PLAIN DUTY.

Michigan, so enterprising in many other ways, should no longer remain idle in her attempts to save the young trees of the forest. Shall we stand idly by and see our young trees and other property perish by fire while in other states they are preventing much of the loss at a trifling expense? I think not, when the people fully consider the subject. Some of us must keep the subject before the people until they give an attentive ear. In some states the fire wardens are men already elected to office in the several townships, such as supervisors, constables, justices of the peace, teachers of the schools, but in any case there must be as in a fire department of a city an efficient head. It is now believed by students of this subject that private owners cannot perform the duty of forestry in America. We have no rich old families who, from generation to generation, have been able to set apart large tracts of land for the growth of trees.

Only the government lives long enough to plant trees extensively. The private individual is too constantly reminded of the fleeting character of life to lay out a forest for succeeding generations. The government alone can hold tracts either long enough or large enough to effect the great climatic changes involved in the preservation of our forests. A great step in this direction was taken in the laws providing for timber reservations. The cutting of timber from such reservations should be done with some system. Fires originate in a variety of ways; by sparks from smoke stacks or live coals from furnaces of railroad engines; by careless firing of fallows or slashings, by tramps, by campers and in other ways. The most devasting fires are fed by the tree tops and other materials left on the ground when the lumberman has taken what he wanted. Men who cut timber on a large scale seem to persist in the statement that they cannot afford to clean up this rubbish after them. They leave it, even though it endangers much property in the vicinity; but I have not time to compass the entire subject. A forest commission, with fire wardens at least for portions of our State, should systematize the work, observe the wants of the people, gather and disseminate valuable information regarding our forests. At the Agricultural College we are making some experiments along this line, and it is not improbable that some of the College lands may be set aside for experiments.

Our forests are suffering today for more persons who have a keener appreciation of nature, a love for trees in particular; persons who like to see trees, to study them, to read about them, to admire their beauty and discover their defects. We need more people who know the names and peculiarities of all our trees, the structure and uses of the wood,—in a word, a little more of botany and plant physiology, and more true patriotism.

What have I attempted to set before you? That it is unprofitable for all citizens and the State to longer withhold means to look more thoroughly after the needs of her forests.

After the reading of Dr. Beal's paper, the following resolution was offered:

Resolved, By the members of this Farmers' Institute, and delegates from other counties and states, that we favor a law, similar to the one enacted in 1887, providing for a State Forestry Commission, and that we pledge ourselves to see that the next legislature carry out our views on this important subject.

Dr. Beal: I offer this resolution, not because I am fishing for a job; I have my hands full now, and more too, and consequently I am the more willing to offer it.

The resolution was adopted.

[Here followed a stereopticon exhibition by Dr. Beal, illustrating the points made in his lecture.]

SOIL AND CROP DAY.

FRIDAY MORNING.

HON. CYRUS G. LUCE IN THE CHAIR.

WATER IN THE SOIL.

HON. A. C. GLIDDEN, PAW PAW.

The thinking farmer comes frequently upon problems, in the course of the season's labor, which are too deep for ready solving. The law of nature seems, in some instances, to have been suspended, and chance takes charge. Some of the mysteries are too high in the heavens for us to investigate, and some are hidden in the earth. The clouds are capricious. They discharge a flood upon us at times, and again they hold the water in suspension and sweep across the face of the heavens, leaving us parched and thirsty for rain. The faithful, enduring, economical soil, drinks up the surplus flood, yet holds a reserve of moisture for the use of plants, and incidentally for our benefit. It is upon this value, and the performance of water in the soil, that I shall address you.

The several kinds of soils have a different capacity for holding water according as they approach or recede from what we are accustomed to call fertile soils; that is, if a soil is poor and sandy, it will not hold in suspension so large a quantity as when it is filled with humus or decayed vegetable matter. It has been found that a clay soil will hold 50 per cent of its weight of water. A loam soil 60 per cent, a humus soil 70 per cent, while a poor sandy soil will hold but 45 per cent. About two-thirds of the annual precipitation (rain and melted snow) is held in the upper five feet of earth. If there was no percolation through it to the water level below, and no evaporation, the soil could hold water enough to grow maximum crops every year. Very much of the waste of water is in evaporation, and is insensible to us. A part goes down to become the reservoir for wells and springs, and the remainder—much the larger part—enters into the circulation of the roots, is carried upward and evaporated by the leaves.

WHAT WATER DOES.

The office of water in plant growth is the most important factor in the economy of farming. We may spread fertility, and mix it with the soil, in exact proportions for the sustenance and growth of crops, but if water is not present in sufficient quantity to dissolve the nutrient elements, the plant starves for want of such support, as certainly as the animal starves, tied to an empty manger. Water falling on a fertile soil soaks out the several compounds, and, while the root fibers are sucking up this bill of fare, the process is kept in operation, so long as water in sufficient quantity is present for the purpose. It has been quite accurately determined that it requires a little more than 300 pounds of water to produce one pound of dry matter in stalk and grain. Spring crops, that require nearly the whole growing season for maturity, suffer for want of rain more than the wheat crop, which gets its strongest growth and root development during the fall and spring, when rain is most abundant.

According to Prof. King's field experiments at the Wisconsin Experiment Station, oats require 500 pounds of water for each pound of dry matter produced, barley 400 pounds, corn 309 pounds. An acre of oats in field produced three tons of grain (seventy bushels) straw and roots, and used 779 tons—equal to seven inches of rainfall. An acre of barley produced two tons of dry matter (40 bushels of grain), and uses 482 tons of water—equal to four and one-third inches of rainfall. An acre of corn averaged four and four-tenths tons of dry matter (66 95-100 bushels of shelled corn), and used 1,492 tons of water—equal to thirteen and one-half inches of rainfall.

It has been shown that a grass plant, in a dry hot day, will lose by evaporation an amount of water equal to its own weight. Ordinary meadow grass is about 70 per cent water, and, estimating the crop of hay at two tons per acre, the weight of the fresh grass, not counting the roots, would be about 6½ tons. This would represent the amount of water evaporated by an acre of grass in a dry hot day, and gives some idea of where a part of the water goes that falls in showers in seasonable years. An inch of rainfall on an acre is equal to about 100 tons of water; and if it could all be utilized in the growth of plants, longer periods without rain would be less distressing.

TOO MUCH WATER VS. TOO LITTLE.

A soil saturated with water, and the extreme of dryness, are equally injurious to the growth of plants. The golden mean is about twenty per cent of water—that is twenty pounds of water to every hundred pounds of soil. If this proportion can be maintained, with the average temperature of our seasons, maximum crops will be grown. As we have seen, different soils have this power of holding water in different degrees. The more fertile the soil naturally, or a poor soil made fertile by judicious farming, will retain more water and hold it in suspension longer than a thin, porous soil. A soil made open and porous by deep cultivation holds more water, which is less liable to evaporate, or be lost by percolation beyond the reach of plants to recover. The problem, therefore, which presents itself, is how to make available more of the water that falls.

There is some movement of water in the soil. It spreads itself out laterally, and when the soil is saturated, or nearly so, there is a movement upward in an effort to keep the particles of soil equally moist, and may be attributed to diffusion, or capillary action, or both. There have been repeated experiments to determine to what extent this movement helps to raise the water in the soil, to compensate for evaporation, and the constant drain upon supplies for the use of growing plants, and its transpiration from their leaves. Experiments at the New York Station with different kinds of soils in glass tubes (1⅝ inches in diameter), the lower ends of which were emersed in water, showed marked differences in the height to which the water would rise by capillarity. In muck it was about 23 inches in seven months, in garden soil about 45 inches in the same time, in sand 20 inches and in clay 34 inches in about three months, when it ceased to rise. The height to which distilled water, manure water and soil extract rose in capillary tubes of small diameter was also observed. Distilled water rose to 4 8-10 inches, and manure extract to 4½ inches. This, it will be remembered, was when the lower ends of the tubes were immersed in water.

There come periods, however, when water remains in the soil in very imperceptible quantities. This quantity varies considerably in different soils, and in the same soil under different methods of cultivation. Every farmer understands that a cultivated field remains moist when his pasture and meadow lands are dried up. What mysterious influence retains the water in the one, while the other dries out? The rains of spring descend on both fields alike, and sink into the earth with equal celerity. When each field is equally wet, one is plowed and the other is not. Cultivation follows the plowing, and when extreme dry weather follows, the cultivated field acquires a degree of moisture far in excess of the pasture field, and sustains the crop in a most miraculous way. This leads to the question; can the farmer control in any degree such an amount of water in the soil as will insure a crop? If you answer yes, then what law of nature is subject to his manipulations?

CAPILLARY ACTION.

Those who have attempted to explain this phenomenon, attribute the impelling force to capillarity, which brings water from a lower level to the surface soil, as oil rises in a lamp wick, or water rises in a piece of cloth when one end is immersed. They say that cultivation breaks the continuity of the capillary tubes, prevents evaporation, and thus compels the water to accumulate in the upper layers of soil, to be fed upon by the growing plants. This reasoning is too superficial. It may account for the movement of water in the soil when an abundant supply is present, but will not satisfy intelligent inquiry when the ground has been parched for a month or more. Capillary action implies saturation near the point affected by it. It, however, has its limitations. It is drawing too heavily upon one's credulity to say that water comes from the permanent supply, ten to forty feet below. The earth, in that event, would be increasingly wet from the surface down to the water level. Conditions of moisture, sufficient to keep corn fresh and growing, frequently occur when the earth is dried out to the depth of six feet or more. No experiments are on record, that show any movement of water in the soil by capillarity in times of drouth. Indeed, the evidence is all the other way. Dr. Ewald Wollney, an eminent writer on the "Physical Properties of the Soil," in an article published by the Department of Agriculture last summer, distinctly states, that "capillary movement of water in a soil occurs only when considerable water is present. It ceases when the soil contains thirty to fifty per cent (according to the fineness of the particles) of the quantity of water required for saturation, and there is a very much slower movement of water from one particle to another." And again he says, "Capillary rise percolation of water in the soil, declines as the water content of the soil diminishes."

Now the water content of a soil, during seasons of drouth, such as we have had for a series of years, has been reduced far below the 30 per cent for sand or the 50 per cent for clay, and capillarity must have ceased its action in the soil, long before a cultivated field began to suffer for want of moisture. The physical conditions of soil in periods of drouth have not been critically studied. Practical men, with keen observation, have asked difficult questions of scientists, and they have answered in a superficial sort of way, applying the explanation of a case that is no parallel to the conditions in question. Farmers are not concerned about the growth of their crops, when the soil contains even 18 per cent of moisture. A water content above that will give them no great uneasiness; nor are they particularly interested in the movements of water in the soil at the saturation point. What they want to know is, will certain manipulations of soil in times of extreme drouth favor the retention of water in the soil, or induce it to gather there, and by what law is it controlled? Every practical farmer will answer the first query in the affirmative; but many hesitate to question nature, especially when the operation of its laws are hid from sight. I lay no claim to scientific attainments. I am perhaps an average observer, and intensely interested in what is going on on my farm, and have studied the moisture problem for the last two seasons with increasing interest. I believed at the beginning that explaining the presence of moisture in cultivated soil by the law of capillary attraction, was fallacious and unphilosophical, and that there was some natural law by which it could be rationally explained. I now believe that vapor arising from the earth is condensed at the surface by a cool stratum caused by cultivation.

DOES CULTIVATION COOL THE SURFACE?

Let us see. Corn has been known to be nipped by frost along freshly cultivated rows, when the uncultivated corn remained uninjured. Strawberries which have been mulched (which is analogous to cultivation) suffer from frost when contiguous rows, unmulched, remain unharmed. Boards, lying on the ground, cool the surface, and we always find frost on such boards if anywhere. These, I confess, are only pointers, which all, or many, have observed. The thermometer test, however, is a better one. Last July I made such a test. My pasture field adjoined the corn field. In the one the grass was dried up and crisp, and in the other corn was in tassel and ears appearing, and still fresh and growing from frequent cultivation. I took a piece of inch and a half well pipe, 30 inches long, and drove it two feet in the ground, into each field, near the gate that opened between them. I then punched out the earth from the lower end, so that the bulb of the thermometer should rest on the earth, and tested the temperature every hour from 2 o'clock p. m. until sundown, both at the surface and at the bottom of the tube, and at sunrise the next morning. My theory was, that the cultivated surface was cooler at times than the lower strata, especially at night, and that the rising vapor from the earth was thus condensed at the surface. I copy from my notes taken at the time. The temperature of the atmosphere was 82 degrees at the beginning of the experiment, dropping to 78 degrees at five o'clock and to 68 degrees at sundown. The surface temperature of the pasture was 110 degrees, and two feet below, 84 degrees, a difference of 26 degrees. In the cornfield the surface stood at 90 degrees, and two feet below, 74 degrees, 16 degrees difference. Two hours later this lower temperature dropped two degrees, remained at 72 degrees, and recorded that at sunrise the next morning. The pasture field dropped to 76 degrees at the bottom of the pipe at sundown and stood at 80 degrees at the surface. In the morning the atmosphere temperature was 52 degrees. The surface of the corn field 64 degrees, 8 degrees lower than at the bottom of the tube, confirming my belief, and proving that the philosophy of my theory was correct, to wit: that vapor rises at all temperature, but on meeting a colder stratum, it parts with a portion of its moisture. This is proved in your common experience. Your iron pump "sweats," as you call it—that is, it is colder when pumping water than the surrounding air, and water is condensed from the atmosphere and collects upon it. Your glasses are clouded with vapor on entering the house on a frosty morning. The invisible vapor arising from the earth becomes visible in minute water drops, called fog, in the lower valleys. You take your jug of cold water to the cornfield, and set it on the dry earth, and in an hour or two the soil below it is wet from the condensed vapors arising from the soil. Here is an epitome of what is going on every night that is cool enough to lower the surface soil a few degrees below that of the strata further down. You do artificially with the jug of cold water just what nature does every cool night, and some cool days in a dry time. To say that water rises by capillarity to moisten the dry earth, when there is not water enough in the soil to be appreciable to the senses, is neither philosophical nor sensible. You may say there is some hocus pocus in the jug (and there frequently is)—that it sweats and runs down, or that it leaks through the pores; but the fact remains that the earth is wet under it, and I believe that it comes through the operation of a natural law, and that this natural law is subservient, in a sense, to the will of man. That when the Adamic decree was given that "in the sweat of thy face shalt thou eat bread," the obligation to cultivate was put upon us, and along with it the laws of nature were made to conform to our efforts, and fulfil the promise of bread.

I am not so pessimistic as to believe that the earth has tipped and our zone changed to an arid one, or that our seasons have suffered a permanent change. We shall again have water in the soil in excess of our needs, when the question of where it comes from will not awaken our interest so much as where will it go, and when? We, however, shall all be the wiser for the experience we have passed through, and our experiments, tending to a solution of the drouthy problems, ought to be set up as guide posts to those who in the following years may pass through like vicissitudes.

DISCUSSION.

Mr. L. G. Solomon, of Dutton, who was to lead the discussion, being absent, Mr. R. M. Kellogg, of Ionia, was called upon in his stead.

Mr. Kellogg: I believe the water comes up by capillary action from below. There is a certain amount of evaporation, but I cannot find, in my investigations, any other force, that cuts a *material* figure, except capillary attraction. You all know that water won't rise to the top unless the earth is close together. It must be firm. That is the advantage of rolling land. There is another thing which leads me to think it is not evaporation. I made a series of experiments last year; I had the moisture within one inch of the top of the ground all last year. We had no rain, but I kept the water within an inch of the top. If you had put that same water under hydraulic pressure, you could have pressed it out of any piece of that ground, from within one inch of the top of the surface to forty feet below. You could have driven the water out, and got it.

I will take this piece of cloth here and saturate it; that is a very important point in demonstrating this principle of capillarity. Take this cloth and dampen it, and throw on it a little sand, and see how quickly every particle will surround itself with a film of water. Not moisture, not dew—it is either water or nothing. The water don't get hot enough to turn it into steam, but every particle of sand will surround itself with a film of water.

Mr. Glidden: Please tell me the difference between the attraction of water films and capillarity.

Mr. Kellogg: The water films come up there, and there the water will stay. It is here in considerable quantities, and a film of water surrounds each one, but there is no current of water. Each of these water films will stay there by itself. Every particle is now surrounded with a film of water, and *wherever* those two pieces of ground are so close together, that in addition to this film of water that surrounds each particle of sand—there is a space, for a current of water to pass—it will and does, pass up. That is the advantage of rolling land.

Another thing; if the statement is true that this water rises by evaporation, a very conclusive argument with me is the fact that I went out last summer and traced this same thing out in the soil. I dug a hole where the ground had not been cultivated, until I came to moist earth, and then I laid some boards over that. You all know the result, for moisture will come up if you cover up the surface. The water comes up from below continually, the moisture rising where it is excluded from the sun, until it gets to the top. Now if this ground is dry, if it is evaporation that comes up, wouldn't the evaporation come up until it struck the loose earth, before it became moist and made the ground wet? Certainly it would.

Mr. Glidden: You dug a hole in the earth how deep?

Mr. Kellogg: Four feet. I covered the ground over, and cultivated the ground.

Mr. Glidden: You filled the hole with loose earth?

Mr. Kellogg: No, let it lie there, and the water comes up from below. In the ground, not in the hole. All this does not reflect on Mr. Glidden nor on me, but I believe that the experiments I have conducted demonstrate that capillarity is the main force that we are to rely on.

Mr. Glidden: Was the hole filled with sand?

Mr. Kellogg: I will explain. You go and take a piece of ground that is very dry and lay some boards down upon it. At the end of four days, you dig a hole—we will say four feet deep—until you come to the moisture. Then wait two or three days and dig another hole by the side of it, and you will find that the moisture line is constantly working from the bottom. The moisture line at the bottom is continually working to the top. That ground is dry until you come to the moisture line, and tomorrow you dig another hole, and you will find the moisture down there, and that the water is working toward the surface. You will find that everywhere you go. Could it be done this way, if it was humidity or the vapor in the soil that comes up? It would certainly wait until it came to that cold ground, made cold by cultivating.

One year, I planted corn; it was on clover sod and I put into that eight inches of manure, and we couldn't plow it under, and so we forked the manure under, and turned the sod on it, and I planted the corn on top and it was ruined; now if the vapor theory were correct, it would have come up through that manure. Vapor will pass from one particle to another, through an opening, but the water in this case came up and collected under the manure, and never got through one particle. It was as dry as a board on top. A friend to whom I was speaking of the fact, put his potatoes on the under side of the manure, and they came up all right, and the water came up by capillary action, or I am fooled. People said, what is the matter? what are they doing to those potatoes? and went off, filled with mystery as to how the potatoes could get through.

Another thing, if you will go out in the field where you are cultivating, and where the ground is pressed down in your tracks, during the day time, you will always find that ground moist on top and the water going off at a great rate. If it be vapor, you have got to have a different system of cultivation, and it is worth while to study this thing. If it be vapor, it will go through the loose earth, and capillary action won't.

Mr. Glidden: I am so unfortunate as to be here without any laboratory experiments to show you, and you will have to take my word on some things. I think I stated in my paper that water would rise four inches by capillary attraction. This is what is done here. You all know in your common experience, that the moisture in your soil gets very low in your corn field. You don't believe that the moisture in your corn field gets down to the permanent supply—way down below. I don't believe there are any more capillary tubes in earth than in salt or sugar or anything else. It will come up four inches, but will it come up forty or twenty feet?

Now, I think I proved to you that the surface of the soil was cooled by cultivation, and I proved to you that the philosophy of this thing is correct—that the ascending vapors do condense upon a cool surface; down at the College a year ago, when it was very cold—two degrees below zero—the President said they most froze to death about the grounds; in the greenhouse the water was pouring down on the inside of the glass. Did the water get up there by capillarity? What made the water up there? Why was the water pouring down on the inside of the glass? Only because the vapor from the steaming beds condensed on the inside of the glass and ran down; that is common sense. Now, I believe that this same law applies in the matter of cultivating the soil. Whenever the soil is cooled to a degree, whenever you cultivate your soil and loosen up the surface, it cools it, and the vapors accumulate there, like dew. It is dew on the plat of grass, it is the cooling of the blades of grass that catch the vapor.

Mr. Kellogg: But I would like to ask why there is no dew on a cloudy evening; that may throw some light on the question.

Mr. Glidden: There is a philosophy for this also. The atmosphere, under different pressures, holds more moisture that at other times. When it is cloudy weather, it is not proof that under those conditions water does not accumulate on the grass blades.

COMMERCIAL FERTILIZERS—IS THEIR USE PROFITABLE FOR THE GENERAL FARMER?

PROF. F. S. KEDZIE, AGRICULTURAL COLLEGE.

In talking of this subject, I have this purpose: I think that in a great many farmers' minds, at the present day, there is this idea: After having talked with the commercial fertilizer people in various parts of the State, representing different firms, many times the farmer has arrived at the conclusion that, if he could only find the right kind of a commercial fertilizer to put on his soil, adapted to his particular needs, it is just what he wants and is suffering for.

I will begin at the beginning of this commercial fertilizer matter, and show you how it appears in my mind, and then I would like to have you take it up if you will, and adapt it to your own conditions. In the first place, in order to consider any question with reference to the manuring of ground, we must understand a few simple principles of chemistry, as related to the soil. We see before us here, for instance, samples of corn, beans, wheat and so on. Now it just happens that these crops take from the soil three substances, which we chemists call elements, and which happen to be the substances in the soil which exist in the smallest amounts. These substances are taken from the soil by the crops that we grow in the greatest amount, and, as I say, they are the elements which are there in the smallest amounts. The elements, therefore, to which we must pay particular attention, are those three—nitrogen, potash and phosphorus, and we speak of them usually, when we are talking of a manure, as nitrogen in the form of ammonia, and potash, which is just what it is, and phosphoric acid.

BARNYARD MANURE.

We will first take up the question with which most of us are well acquainted, barnyard manure. Take a ton of barnyard manure. When we draw out that ton and put it on the land, how much of these three elements do we take out there in that ton? I have made a little diagram here that will answer that question (exhibits diagram). The horizontal line represents the relative amounts of ammonia, potash and phosphoric acid contained by the barnyard manure contrasted with a commercial fertilizer. What is the condition of barnyard manure as to moisture? Ordinary barnyard manure contains from 75 to 80 per cent of moisture. If you will look at the diagram, you will see how the fertilizer agent is able to talk to you as he does about the value of a ton of fertilizer. Observe the lines representing the value of a ton of barnyard manure, and also those representing the value of a ton of commercial fertilizer. As we look at these, we are struck with the idea that perhaps after all barnyard manure, as compared with commercial fertilizer, is a poor sort of thing, but now let us see why that is so. Let us explain this diagram. In the first place, commercial fertilizer contains very little moisture, and that practically accounts for much of the difference.

BARNYARD MANURE DEFICIENT IN PHOSPHORIC ACID.

What we find—that is, those of us who are engaged in fruit growing—is that barnyard manure is deficient more or less in this substance which we call phosphoric acid. The fertilizer manufacturer takes that into consideration, and when he makes his mixture of material to sell, he makes it in such a way that he reinforces the barnyard manure, which is weak in phosphoric acid; and he supplies this by the use of ground bone treated with acid. In modern times, we have the discoveries of the phosphate beds of South Carolina and Florida, and these sources are now perhaps as much or more used than the bone dust.

VALUATION.

When we place a value on any plant food, it is, we might say, an ideal value. Suppose, for instance, in conversation with a fertilizer agent, he says he has a ton of fertilizer which he will sell you for $25.00 and at the market price it is worth over $30.00. You say, how can it be worth over $30.00 and he sell it for $25.00? What is meant by valuation? It is said, for instance, that phosphoric acid is worth eight cents per pound and ammonia sixteen cents a pound, and potash six cents. How do we know that? Each year a commission of gentlemen go to the city of New York and buy at the cheapest price possible the substances containing these materials. They see what they can buy them for in large amounts and find, we will say, that they will have to pay six cents for potash, eight cents for phosphoric acid, and sixteen cents for ammonia, and thus they determine the valuation of these materials. Does the result of their inquiry tell us if we put a fertilizer containing these materials on the land, we will get twenty-five cents worth back again in the crop, because we had to pay twenty-five cents for it? That does not follow. The fertilizer is worth that because it costs that.

There is a law in this State which requires that every substance offered for sale to be put on land as a fertilizer, which is sold for $10 per ton or over, must be analyzed and its composition determined. From the composition the value is determined in this way:

For every pound of ammonia	.16
For every pound of potash	.06
For every pound of phosphoric acid	.08

What the fertilizer sells for and the "valuation" calculated in this way must agree closely, or customers for the fertilizer will be wanting.

I would like to ask this question: If you had the money to invest, and you had to pay for barnyard manure $1.25 a ton, which would you take, twenty tons of barnyard manure or one ton of the commercial fertilizer?

A voice: The barnyard manure.

Prof. Kedzie: We know that barnyard manure has certain effects on the soil that must not be overlooked, aside from the plant food it contains, and we know that it produces certain physical effects which commercial fertilizer cannot produce. When we look at commercial fertilizer and realize, that although its composition shows its richness in plant food, that its money cost would purchase at the same rate twenty tons of barnyard manure, we consider that barnyard manure is still a *good thing* for the general farmer.

THE USE OF FERTILIZERS IN MICHIGAN.

Before I had been looking into this matter very long, I made up my mind to find, if possible, some record of what had been done in this State, in the way of purchasing commercial fertilizers. Going to the State census, I found the amount of money spent in the different counties of the State for commercial fertilizers, and have compared the amounts expended in the years 1883 and 1893, as given by the State census for 1884 and 1894. (The upper line represents 1883, the lower 1893, in the diagram.) And now the question is, is there any difference between the amount expended in 1883 and 1893. Was it more or less, and which was it?

Q: Didn't the prices have something to do with that? It don't pay to put any money into a crop at present prices.

Prof. Kedzie: No doubt that has much to do with it, but the times were not so hard in 1893 as at present.

Q: Does this include plaster?

Prof. Kedzie: As near as I can find out from the census office it does include plaster, but before we get to discussing these side topics, I want to ask: Is there any exception to this apparent decline in amount of money spent for fertilizing in any county? Look at the chart of the counties represented—Barry, Branch, Calhoun, Cass, Kalamazoo. When we reach this last county we find an increase in the amount of fertilizer used in 1893 as compared with 1883. How shall we account for this?

Mr. Morrill: They have found commercial fertilizers successful in celery growing.

Prof. Kedzie: That is a special crop. Now I am considering the general farmer. The special farmer, as Mr. Morrill suggests, the celery grower, has tried commercial fertilizers and finds it pays. The general farmer seems, from the census figures, to be in doubt, if not to have largely abandoned their use. I am not absolutely certain whether plaster is included in the census figures or not, but leave that out of the question for the present; the diagram shows that the general farmer throughout Michigan is spending less money for fertilizing his fields than formerly. Whether he should not spend more is a question worthy of consideration. Experiments with commercial fertilizers cannot be tried by us at the experiment station satisfactorily; we must look to our farmers to try more of these experiments on their own farms, and, while I have no authority to announce it, I think we shall soon have some word from this direction (not statistics), but results reached by farmers in their individual localities, and on a wide difference of soil.

DISCUSSION.

Mr. E. C. Bearce, of Grand Rapids, who was to have led the discussion, not being present, it was continued generally.

Q: I am a resident of St. Joseph county, and I think plaster would be included there; we used plaster extensively in those years, but later we have used little of it.

Prof. Kedzie: Did you ever use commercial fertilizers much in that county?

A: Not but little.

Q: Would you advise using plaster on new sown clover, in order to give it a start?

Prof. Kedzie: I would like to be able to answer that question. Five years ago I could have said, right off, and could have been sure—ten years ago, perhaps—but now I have come up here to Grand Rapids to find out that point. How many at the present time have abandoned the use of plaster, in this sense—that they place no confidence in plaster applied the way it was ten years ago? (Votes were 36 to 40 in favor of plaster.) How many believe that if you use plaster today, you get as good results as ten years ago? (No votes at all. Experience called for.)

Mr. ——————: I live in St. Joseph county, and I remember well when plaster was shipped in there by train loads, and my experience is this: I have tried it by sowing a strip and leaving a strip, and I couldn't see any difference. But I will say this, that in years past, we never failed to get a catch of clover, and we always had the plaster on. My father hauled plaster way back in the forties, and he thought it paid him well. Then the railroads came in and it was shipped in in carloads, but of late years the plaster has been dropped entirely. Those who do so, say that it holds the moisture, but we have abandoned it almost entirely.

Mr. ——————: I live in Kent county, where they had plaster forty of fifty years ago, and they used to drive in from St. Joseph county and Kalamazoo and take back a load of plaster. As far as I know there is but little plaster used now, here in this county, compared to the amount used thirty years ago.

Mr. ——————: I am strictly a mossback, but I have heard gentlemen like Mr. Glidden and others, men of much experience, say that they thought they could write their name with plaster on a new seeded field, and read it all summer in the effect on the crop. Now ten years ago there was a fight on between the plaster bed owners and the State Grange. Plaster was then put on board the cars here at the price of shoveling a load of sand, 75 cents a ton. I bought it and sold it by the carload, and we had wonderful crops then; I could get a catch by carrying an empty seed bag across the lot; today, I am sowing no plaster, but I have, for the last three years, lost 100 acres of seeding each year. I would buy plaster, and borrow money to do it, if I thought there was any particular virtue in it. I am satisfied, however, that in those years there happened to be a peculiar condition of the atmosphere, by which, at that particular time, the sowing of the plaster conserved the moisture and started the tender little plants; in fact, I have myself repeatedly observed that a single shower at the right time will save the clover in one field, when the one in the next field is killed. I don't think it is a fertilizer, at all.

Q: Isn't it a fact now, that the better qualities of the plaster are taken out, and that as it is now shipped it is not any good?

A: I believe that the plaster today is just as good as twenty-five years ago.

Mr. Glidden: It has been stated that I wrote my name on a piece of ground with plaster and expected to read it—thought that it would appear in contrast to that without the plaster. It never did. I have seen plaster on a field that was recently broken up—within the last five years—and it won't show itself anywhere. Twenty-five or thirty years ago the plaster did show itself, and we knew it; today, under the same circumstances, it seems to have no effect, even on the new ground. It is claimed that it is retained in the soil. the plaster sown in years past, but why do we not see its effect on the new fields that have never had a bit of plaster? One gentleman in the northern part of the State said that he had not had a failure in clover in seven years. He was the only man in the Institute to have a catch this last year, and he attributed it to plaster. And he was the only one, I understood, who sowed plaster.

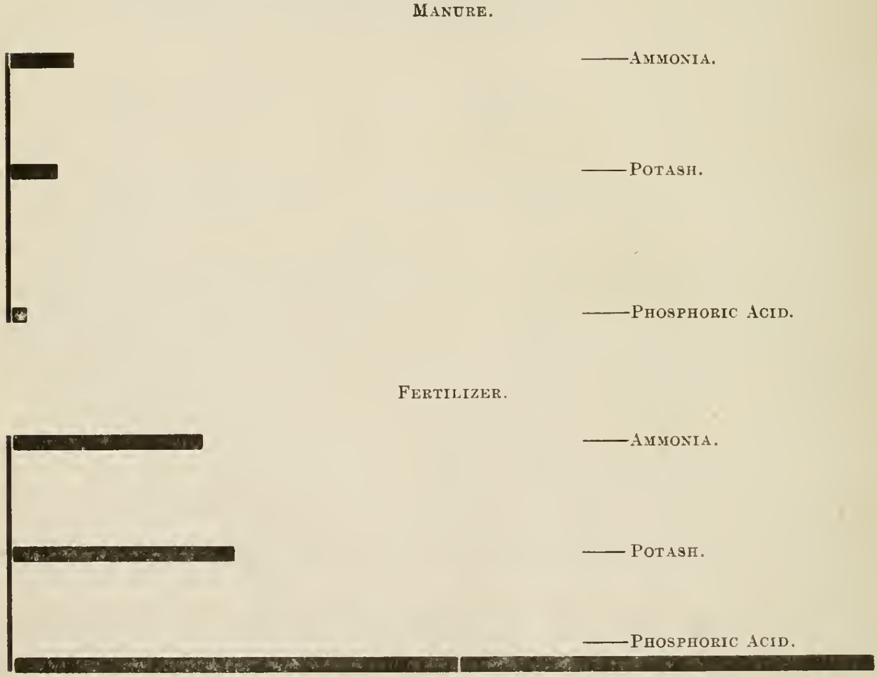
I remember when I was a boy about ten years old, my father gave me my first experience in sowing plaster, and from that time up to the present, nearly every year we have sown a little. I have looked over the meteorological record, and I confidently believe that where we have plenty of rain, more equally distributed, as we had fifteen or twenty years ago, the plaster would do more good, but I don't believe we get as much benefit in these years of extreme drouth. Three or four years ago we sowed a small amount, to see if there was any effect, and we could not see any benefit. We tried sowing it on wheat stubble, and there, I could see, after one or two rains in the fall, that the young clover in the wheat stubble was better where the plaster had been sown.

Q: Have you tried sowing it on wheat stubble?

A: That has been my practice, and I think that the effect is good. I never sow it in the spring of the year, but just as soon as I can get it on after the harvest is done. We sow 100 pounds to the acre, and I haven't, as a rule, failed in the seeding until last spring. Last year I seeded a field of corn, seeded between the rows, and while the drouth killed it everywhere else, between the corn, in the corn rows, there was as nice clover as you would care to see. About twenty years ago, I rented a farm, and the man I rented of furnished the plaster. He furnished from three to five tons of plaster, and I could see no good from it and told him so.

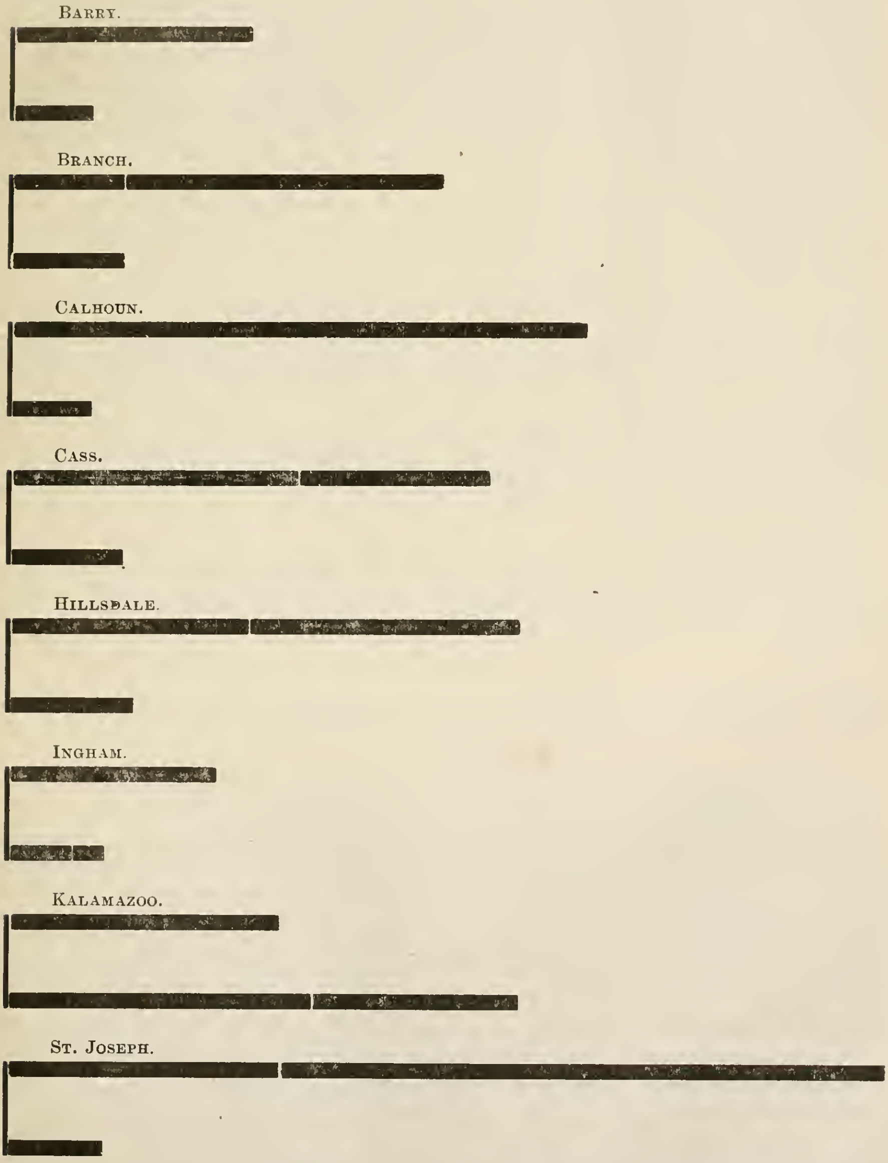
I cleared a piece of land a few years after, and I told the man I would experiment on that piece of new land. I did so by sowing plaster on half of a ten acre lot, and I sowed salt on the other half. For two years, it showed the effect of the salt, but where the plaster was sowed, it never showed at all.

BARNYARD MANURE AND COMMERCIAL FERTILIZER.—COMPOSITION COMPARED,—ONE TON OF EACH TAKEN.



COMPARATIVE AMOUNT OF MONEY PAID FOR COMMERCIAL FERTILIZERS USED IN 1883 AS COMPARED WITH 1893, AS GIVEN BY THE STATE CENSUS.

(Upper line 1883, lower line 1893.)



REPORT OF COMMITTEE ON RESOLUTIONS.

Hon. Thomas Mars, chairman of committee on resolutions, presented the following:

WHEREAS, The State Board of Agriculture, through their very able and energetic agent, Mr. K. L. Butterfield, have held and organized Farmers' Institutes in sixty-eight counties of this State, all of which are well attended and permanently organized for future good work, and through the wise action of the legislature it has been made possible to organize Institutes in every county in Michigan, extending information and useful knowledge to all the people, reaching localities that have heretofore been compelled to draw on their own resources for general agricultural information; therefore

Resolved, That we, the farmers, fruitgrowers, and citizens of this State, extend hearty thanks to the legislature, the Board of Agriculture, the Professors of the College, and to all who have assisted in any way to make these Institutes such a signal success, and the Round Up, here in this grand city, one of the largest gatherings of farmers ever held in this State.

Resolved also, That we extend to the Kent County Institute Society, whose guests we are, our lasting obligations for all the courtesies received, and to the citizens, members and State officers, who have spared no pains to make our stay here so pleasant; and to Mrs. Mayo and her able coworkers, who have made it possible through the woman's section of the Round Up to convey to the wives and daughters of the farm a system whereby they may accomplish their duties in and about the home, lighten their labors, and give more hours to enlightenment and pleasure. And last but not least, to Mr. Chubb, for his numerous recitations; and be it

Resolved, That we are under lasting obligations to the Board of Trade of this city, and to the hotels, for their courtesy and the treatment received during this grand meeting.

Signed by the committee.

Motion made and supported that the resolutions be adopted. The motion was unanimously carried.

THE PRESENT STANDING OF ENSILAGE AS A FOOD FOR STOCK.

SECRETARY I. H. BUTTERFIELD, AGRICULTURAL COLLEGE.

The use of silos for the preservation of fodder was introduced into this country in 1875. Dr. Manley Miles, of Michigan, claims the honor of building the first silo in the country. The first one that I saw in this State was in 1883, built by Edwin Phelps, of Pontiac, in the corner of a basement barn. By 1886 a number of farmers in different sections of the State had built one. By the last census, I find that on June 1, 1894, there were, in this State, 501 silos, with a capacity of 52,846 tons. The number of acres of corn grown for silage in 1893 was 7,259. An average yield of 7.28 tons per acre would fill these silos. Lenawee county had the largest number, forty-three. Ingham county next, thirty-seven. Both of these are dairy counties. The total number in the State is very small considering the demonstrated value of this method of storing forage for stock, for there can be no question but the silo provides means for storing forage, especially corn fodder, not only in an economical manner as to storage room, but it also preserves it in a condition for feeding to stock far better than is possible by any other method of storage.

It may be true that if corn fodder could be perfectly cured in a dry state, without exposure to the weather, the results from feeding would perhaps be quite equal to that of the same fodder preserved in a silo. But it is not possible to do this, except in extraordinary cases where there are no rains during the fall, or where there is but a small quantity of the fodder to be cared for, and it can be put up in sheds or lofts where it will not heat. But with careful handling and filling, corn in the silo can be almost certainly brought to the time of feeding in good condition. While it is more especially adapted to the feeding of dairy cows, it is equally useful for all kinds of cattle, as well as for sheep. Some farmers have fed it to horses, but others have tried it and declared that it has proved hurtful to them.

SILOS POPULAR WITH THOSE WHO HAVE THEM.

Answers to inquiries sent out to those who were using silos in 1889 elicited very satisfactory returns. E. J. and J. R. Learned, of Port Austin, said, "We are feeding forty-seven milch cows this winter, and the flow of milk is nearly the same as from pasture." Merrill & Fifield, of Bay City, wrote, "We never wintered our stock (pure bred Hereford cattle) so cheaply or satisfactorily as we are doing this winter. Five acres of corn fed sixty head, one bushel each per day, for four months." James M. Turner said, "Our silo holds 400 tons. We feed two bushels to each cow per day, in two feeds, with bran. We think our cows give more and better milk when fed ensilage than any other feed we have tried." Mr. Turner still keeps some 300 cows, and is an enthusiast on the value of the silo. Many other favorable replies were received, and so far as I am aware, but few who have used the silo have abandoned its use. The question arises, if the silo is so valuable,

WHY ARE THERE NOT MORE IN THE STATE?

In the first place, new methods are introduced slowly. At the beginning there seemed to be some trouble to properly fill and cover the silo; people doubted whether the ensilage would keep or not. It was soon demonstrated that there was no trouble in keeping the silage if the silo walls were comparatively air tight. It was also found that it was not necessary to weight the silo, but simply cover it with something that would make it as nearly impervious to air as possible. Again, at the beginning, extravagant claims were made as to the feeding value of ensilage, which prejudiced the farmers against it, because they very properly reasoned that it was not possible to add anything to the feeding value of corn, by cutting it green and putting it in the silo. Again, it has been thought by some that it was an expensive method of storing fodder. This is not correct, because the same amount of fodder can be stored with less expense in the silo than in an ordinary barn; that is, storage room for twenty acres of corn in the silo will not cost as much to build as to erect a barn or shed to hold the same amount. The expense of machinery for filling it is also another item, and this is considerable unless a silo is quite large, or the farmers already have power at hand. Careful estimates have shown that three tons of ensilage are equal to one ton of hay for feeding. A silo holding 180 tons of ensilage, having 54 tons of dry matter, would hold but 23 tons of red clover with 20 tons of dry matter; hence, while the silage space costs more for the cubic content, yet at the same expense quite as much forage can be stored.

As I have said, if corn fodder could be perfectly cured in a dry state, it might be equal for feeding purposes to the same amount of fodder put in the silo. Still, for dairy cows, ensilage has the advantage of being more succulent, and hence more productive of milk. This kind of feed also has its advantages over dry fodder in keeping stock healthful during our long winters. I find that one reason of prejudice against ensilage has come from observations of the effect on stock where large quantities are fed. It has not been found desirable to use more than two bushels per day per animal for cattle, making up the balance of the ration with bran and dry fodder of some kind. In the first place, corn, and corn fodder alone, is not a perfect food for any kind of stock; and secondly, it is not healthful to feed stock entirely on this green food in cold weather.

Since the first silos were filled, there have been some changes in the growing of the crop, the construction of the silo, and the method of filling and covering, which have greatly simplified and cheapened the work. For some years it was thought that the amount of fodder that could be grown per acre, without reference to its quality, was the desired object, and southern corn, that grew immense stalks but produced no ears, was used to a large extent. This made very poor fodder. Later it has been found best to use our common corn, planting it less thickly so that it produces a large quantity of ears, and put it in the silo at maturity, this method making the most desirable fodder.

THE SILO.

At first it was thought the silo should be constructed of solid masonry, but it has been found that wood and paper are the best materials for construction. A dead air space is what is desired, and this can be secured by the use of tarred paper with wood outside and inside for protection at a very moderate expense. The form of the silos has also changed; formerly they were constructed in a square or rectangular form, but it was found that it was very difficult to construct the corners so that they would be air tight, and there was, at times, considerable loss of silage; hence the round silo was introduced, which is a much better form, and within the last year, silos have been constructed simply with 2x6 pine, dressed in the form of large staves, and set up with strong iron hoops in the form of a large tub. This has been found to preserve the silage completely without any other protection, although it would be well to afford some protection. This form is much cheaper than any other, as it takes far less material. Three-ton silos, made in this form at the College, have kept silage perfectly for two winters.

It was formerly thought that filling the silo must be done slowly, covering a period of several days, letting it stand between each successive period a day or two, to let the contents become hot, but it has been found that it may be filled either way—slowly or as quickly as possible. If the silo is square, the corners should be thoroughly packed as the filling progresses; otherwise the silage will not be compact, and consequently will be more liable to decay. Since the addition of carriers to the machines for cutting the silage, the trouble and expense of filling the silo have been greatly decreased. Some are using windmills to run the machines, with satisfaction. At first it was thought that the silo must be covered with heavy weights put on to aid in settling and packing, but it has been found that covering with chaff or marsh hay will answer every purpose; even if no covering is put on; while a few inches of the silage on top will decay in that process, it becomes a protection to that below, and, with the exception of the loss of five or six inches at the top, the remainder will be well preserved.

SILAGE IN OTHER STATES.

Silage seems to be held in greater estimation in some other states than in ours. In Wisconsin, in the dairy district, nearly all the dairymen have silos. Governor Hoard, of Jefferson county, Wis., writes me that in his county, which is a great dairy county, the farmers think they could not get along without the silo, and that no one who uses one ever returns to the old way. But it is true that in our State there is still a prejudice against their use and a feeling that ensilage is not a good food for stock. Yet, with a failure of clover, it seems to me that the use of corn silage will take the place of clover better than any other forage crop yet introduced. But it must always be remembered that some nitrogenous food must be used with corn. Nothing is better for this purpose than wheat bran, although, of course, oil meal may be used at present prices with favorable results. There is no question but the same acreage will produce more stock fodder with corn than with any other crop that can be used, and with our present system of cultivation it can be produced about as cheaply per acre as any crop, and much cheaper for the same value.

A word as to the growing of corn fodder for silage. I believe as to thickness of planting, neither extreme should be followed. If sown too thickly the fodder is not of so good a quality, not so many ears, and if too thinly, while the quality is high, there is not enough of it. My observation and experience indicate that the most value can be secured by planting or sowing the corn about twice as thick as with ordinary field corn, using about ten to twelve quarts of seed per acre. This makes a large amount of fodder and also a large quantity of ears of corn, making a silage quite rich in grain.

Corn has been the only crop used for silage to any extent in this State. I have heard of a few silos that have been filled with clover, but usually the clover has been made into hay. In Wisconsin, I learned that they frequently filled the silo with clover with good results, but there is not so much advantage in putting clover in the silo unless it might be in a wet season when there is difficulty in curing it. At the College, millet was successfully used in the silo, and rye cut green has also been preserved, and might be worth trying, particularly for summer use to help out the pastures in July and August.

DISCUSSION.

LED BY HENRY J. MARTIN, VERMONTVILLE.

I built my silo in 1890. I was induced to do so from the fact that, after due deliberation and correspondence, I was convinced that the greatest amount of feeding value, or rather that the greatest amount of valuable food, can be obtained for any kind of stock through the silo, and my own experience bears that out. In the first place, it has been emphasized that the corn should be matured. That has been demonstrated a great many times. Take the corn through this section, and in the central part of the lower peninsula, the white or yellow Dent corn, with large ears, is the kind I have found successful. These ordinary kinds, well cared for, insure us from seven to ten tons of corn in a silo, from one acre. My limited experience, and the universal statement of those who have compared results, is that two and a half or three tons of this silage that is mature will weigh from 4,500 to 5,000 pounds, and that three tons of that is equal to a ton of hay. The hay crop in our part of Michigan is very poor. In our county, our average crop is less than two tons to the acre. You take a steer and feed him fifty pounds a day, and five tons of silage will carry him through. You feed hay to the Shorthorn steers, and at the price Mr. Ball claimed to get, he would eat his head of with dry hay, but on silage the expense is light.

In regard to feeding it to horses. I have fed it more to horses than any other stock, though I have fed it to sheep, etc. I have not found it a success to feed to colts, however, until they get one year old. After that you can feed them twenty-five pounds a day, but you must give them dry food with it, hay and grain. I have carried through colts, from one to five years old, on twenty-five pounds of ensilage, and some hay and grain, better, and with *half the expense* of some of my neighbors who used just hay and grain. One neighbor of mine built a silo for a valuable herd of Percheron colts. He set his corn thick together, cut it before it eared out, and fed them that and nothing else, and the whole herd nearly died; but take corn that is matured and well put up, and use it with dry food, and I have had grand success.

A voice: A great objection with many gentlemen in building a silo is that there is quite an outlay.

Mr. Martin: Yes, one expense is the cutter, but I had confidence enough in it to buy my own machinery. There is one thing in regard to a silo that I have never dared talk about very much, when the question has been raised. There are two things that have called my attention to it. Our friends, Mr. Ball and Mr. Spaulding, had a lively talk through the *Michigan Farmer*, as to the relative merits of using the silo and cutting up the corn in the ordinary way. Such a discussion is interesting, and I haven't dared say much about Mr. Ball's position. This last fall, I didn't fill my silo, the stalks were put up in the ordinary way; I have had grand good success in feeding those stalks, but I prefer the silo from the fact that you can take care of it all at once, it is all put away with one movement. Of course there is some waste, and no additional feeding value—you don't put in one pound more of nutriment than nature put there, and as I say there is a little bit of loss—yet all things considered, I am an enthusiastic believer in the silo. I believe it is one of the most important adjuncts of our diversified farming.

My plan in planting—I have tried two ways, and am not exactly satisfied with either one, and I would like the opinions of representative farmers. My first practice was to plant with a 11 hoe drill, stop up all but three feeders, and so have rows 33 inches apart. The other way was to plant hills thirty inches one way and forty-six the other, and that is practically the same thing as rows, four feet apart.

My plan of filling a silo has been to rush it—hire additional help. I use a Smalley cutter, with fourteen-inch knife, and, taking the ordinary corn, I can put through seventy-five tons in an eleven hours' run. It has been my policy to hire all the men and teams I could, and rush it as fast as possible.

My silo is square. If I build another, I should investigate thoroughly. I don't like mine; I think there are better forms than the square.

One great source of trouble I have is in keeping up the fertility; it is one of the most serious problems before the farmer today. The matter of fertilizers. I cannot make the barnyard manure I want, though I save every ounce. When it comes to clover, I haven't had a catch in six years. How shall we keep up the fertility? If you can make three tons of silage, that is an average crop. three to three and a half tons per acre, you increase the feeding capacity of your land very much, in sustaining stock, and are thus enabled to make more fertilizer. That always holds true, that wherever you can keep more stock you increase the fertilizer, and that is a very important consideration.

I would like to ask Mr. Butterfield a question. I think he stated that there was one-tenth difference in the nutriment of the silage and the dry fodder. As a usual thing, the corn is cut with the feed, in building a silo. Wouldn't that corn more than overbalance? Wouldn't it be cheaper to feed the dry corn and the fodder separate?

Mr. Butterfield: You are comparing corn and fodder, put in the silo, with dry corn fodder, without the corn? I did not understand that it was compared that way.

Mr. Martin: You compared the silage without the corn, to the dry fodder.

Mr. Butterfield: That was taken from a test made at the Experiment Station. The question of the loss of corn in the silo is something that has not been fully tested, and that was one of the things I had suggested, in regard to further scientific work. There is something going on this winter, I think, which may result in developments of interest. It is not known what the loss of corn would be, with corn ripened on the field.

FRIDAY AFTERNOON.

GROWING POTATOES.

I. N. COWDREY, ITHACA.

The potato question is rather a dull one to talk on at the present time, and instead of telling how to raise more potatoes, it would be more in order, perhaps, to try to tell how to get rid of what you already have on hand at a profit. I heard one man say that there was money in potatoes at present prices, for he had put money into it and hadn't got it out yet, so he concluded there was money *in* it.

SOIL.

My choice of soil is, for potatoes, first, a sandy loam, next a gravelly loam, and a clay loam next. Do not consider muck land good at any time. A clover sod is always desirable. All cannot have the right kind of soil, but can nearly always have the clover sod.

The ground should be well plowed, about eight inches deep, and well fitted with fine harrow, so as to cut the soil up very fine. A roller should never be used, as potato ground should be kept loose and not packed down.

PLANTING.

We plant in drills, with rows thirty-two inches apart, and from twelve to twenty inches apart in the rows, according to varieties; the earlier sorts being twelve inches and the later kind twenty inches. We furrow out with a Planet Jr. horse cultivator with furrow attachments, about five inches deep. We drop by hand, one piece in a place, and cover with a plank float or spring tooth harrow, with teeth set shallow so as not to displace the potatoes. We cut our seed with reference to the size of the piece, rather than to the number of eyes in a piece. A potato the size of a hen's egg is cut once in two lengthwise, and the larger ones are cut more with reference to the eyes, from one to two eyes left on a piece.

CULTIVATION.

After the potatoes are planted and before the weeds begin to show, we go over the ground with a spring tooth harrow with teeth set shallow, and continue this dragging until there is danger to the potatoes. This treatment kills every weed. After there is danger of using the spring tooth, we use a smoothing harrow or weeder quite frequently, and continue until the vines are six or eight inches high.

The first cultivation with a horse cultivator should be deep, and gradually get shallower as the vines grow larger, till at last all cultivation should not be over two inches deep. Fine cultivators should be used so as not to hill or ridge up, but leave the ground as nearly level as possible, and fine and mellow at all times. The cultivator should be started as soon after a rain as the ground will permit, so as to keep any crust from forming, and to save all the moisture possible. Wide tools should be used so the ground can be gotten over in a hurry. The rows should be the same distance apart at all places, so once in a row with a cultivator will be sufficient to stir all the soil. We have a board attached to the rear tooth of our cultivator that smooths out all the marks of the teeth and leaves the ground perfectly smooth and level. There is nothing but my footprints to be seen behind the cultivator.

Cultivation should be kept up as long as it is possible to get through the vines without injury. We went through ours last year after the vines began to die. This did the potatoes no particular good as I know of, but it kept the weeds down so that at digging time I could carry all the weeds on five acres in one hand. No weed should be allowed to grow, for at this time of the year the potato needs all the moisture. It takes about 300 pounds of moisture to make a single pound of dry weeds, so you that let weeds grow can see how much you are robbing your crops.

HARVESTING.

We use potato boxes holding a bushel, the size of which is, inside measure, 16 inches long, 13 inches high and 13 inches wide.

These boxes can be easily made out of any strips that may be found around the farm. Can be made on rainy days, and come handy for many things during the year.

The potatoes are picked up as fast as dug and drawn directly to the cellar.

VARIETIES.

As to varieties, every one has his choice and claims it to be the best. I think the reason for this is, that the same variety won't do so well in one locality as another. What might be good for my soil would not be good for another. Seed should be well kept and not allowed to sprout before planting. This can be done by burying them, and after the pits are well frozen to cover them with coarse manure or straw to keep the pit from thawing. If properly done, potatoes in this latitude can be kept until the first of June without damage from sprouting.

SCAB.

I don't think there is any question that the treatment for scab is a benefit, but my potatoes do not scab very bad. I have planted very scabby seed, and have got smooth potatoes. I have been sometimes almost sceptical with regard to this treatment, but we have such good authority on the subject that I don't feel like condemning it.

BUGS.

In taking care of the bugs we generally use Paris green. Sometimes we bug by catching them in pans with handles on, so we don't have to stoop. This is a good way for patches up to three or four acres. I can bug in this way two rows at a time going at a pretty good gait. We use a ten quart pan with a handle about twenty inches long nailed on one side, and gently strike the potato hill with this pan, causing the bugs to fall into it. At each end we have a can sixteen inches deep, with perpendicular sides, that we empty the bugs into and pour hot water over them. One advantage in this method is that the bugs cease to do business as soon as caught.

DISCUSSION.

Q: What yield do you get?

Mr. Cowdrey: My yield this year with the Freemans was 100 bushels per acre of marketable potatoes; with the later varieties, perhaps 200 bushels to the acre.

Q: What time do you plant your potatoes?

Mr. Cowdrey: I have aimed to plant them early—quite early—especially the early varieties; usually I plant my potatoes about the first of May.

Q: Do you recommend fall or spring plowing?

Mr. Cowdrey: That depends; on my soil, fall plowing will not do, early spring plowing will not do. I want to plow as close to the time of planting as I can; that suits my soil.

Q: What is your soil?

Mr. Cowdrey: A sandy loam, where I live now; on the farm, it is a clay loam.

Q: Are there any ridges?

Mr. Cowdrey: It naturally works up a little bit, in cultivating, but I don't hill a potato under any circumstances.

Q: Are you bothered any with sunburned potatoes?

Mr. Cowdrey: No, sir; I don't think I had a peck this year.

Q: Do you pay any attention to the time of the moon?

Mr. Cowdrey: Yes, I do; I believe it is the proper time to plant potatoes in the moon.

Q: What time of the moon?

Mr. Cowdrey: Full of the moon.

Q: What effect can the moon have on the potatoes?

Mr. Cowdrey: You can see to plant later at night. (Laughter.) No, I will tell you my idea about that moon theory. I plant when I get ready; I never wait for the moon to full, I plant when the ground is in good condition.

Q: How deep do you plant?

Mr. Cowdrey: Four or five inches.

Q: Have you had any experience with the potato planters?

Mr. Cowdrey: I never had, but I intend to this next spring.

Q: How small do you cut the seed?

Mr. Cowdrey: A potato as large as a hen's egg, I cut once in two. I don't reason about it; sometimes I have one eye, sometimes two; if I have three, I don't care.

Q: I would like to ask how long you cultivate, without regard to the potato plant. How long do you use your drag or weeder, regardless of where the plants are setting?

Mr. Cowdrey: I have gone through when they are seven inches high. I have gone through with a little fine drag when they are six inches high, and with a weeder when they are even higher. It will do no harm, and will take all the fine weeds that are starting. If weeds should spring up afterwards, pull them out. I don't allow weeds to grow on my potato bed. I won't have anything there to take the moisture.

Q: Do you use large potatoes for seed?

Mr. Cowdrey: Sometimes I do and sometimes not. I forgot to tell you how I have practiced in that regard. A few years ago I had 200 bushels to choose seed from; I took out two bushels of the very choicest seed, those potatoes that suited me as to type and size. I planted those at one side, to choose seed from the next year, and then I planted the whole crop, just as they came; but before planting them, I took out these two bushels, as I have described, for seed the next year. I think if that were followed up, potatoes would not run out.

Q: What trouble have you had with the scab, and what is your cure?

Mr. Cowdrey: The method is corrosive sublimate, but I have never had to use it.

DISCUSSION.

LED BY MR. L. J. POST, LOWELL.

As far as criticising anything that my friend has said, I should be very diffident about doing it; there is no question but that he is a very successful potato grower. But a person who makes a success of potatoes may do so in a different way. I differ from him in a good many respects.

In the first place, in regard to the seed. I do much as he said he did, only I would make a difference in regard to the variety. With an Early Ohio, I would use twice as much seed as with the Empire State, World's Fair, or anything of that kind. I prefer to cut two or three eyes to the piece, I get better sized potatoes. For several years I cut one eye, and it works very well if the pieces are good; if not, you get a stronger start with a larger piece. For a good many years I put potatoes in drills; I plant in hills, rows both ways. My land is hilly, and I know that a good deal of the ground through the country is hilly. If you plant in drills and leave the ground a little depressed, as will occur in filling with a horse, and a violent storm comes, it will clean out the whole row perhaps, from the top of the hill to the bottom. I plant three and one-half feet apart, as I did a number of years ago; it stands the drill better, and I can cultivate with less labor, and there is little difference in the yield per acre, on any ordinary soil. If your land is in the highest state of cultivation, you will get more potatoes with the closer planting.

A BIG YIELD.

A few years ago, I paid a dollar for a pound of a certain variety of potatoes. There was a premium offered to the man who would raise the largest amount of potatoes from a pound. I fixed up a place in my garden, and cut that pound so I made eighty hills. I made four hills out of one eye—if you will examine the eye, you will notice that there is more than one sprout from an eye, and with a very thin knife you can separate these. I put those hills four feet apart each way. I got potatoes at the rate of over 400 bushels to the acre—some twelve bushels from a pound—but I didn't get there after all; a fellow in Kalamazoo got fourteen. I always thought he worked it someway.

In regard to the cultivation, the condition of the ground makes a good deal of difference with me. Many times in the spring of the year, after you have planted your potatoes, a severe rain comes, the ground is packed down, and these weeders don't take hold as they should. I have a weeder and use it, but if the ground is in that condition, if I can see the marks, even if the potatoes have not come up, I go through with the cultivator and set it as wide as I can. You won't disturb the potatoes as easily as you think. I work the ground up loose in that way, and then go through with my weeder and make it clean. If you go through with the weeder on that hard ground, you don't do the work you think you will. The after cultivation depends on the condition of the ground. If the ground is hard, I loosen it up, unless it is late in the season. Unless the potatoes have advanced so far as to fill the ground pretty well, with roots. I wouldn't do that after the potatoes have advanced.

In regard to gathering a crop. I have for a number of years used sacks—not these thick, clumsy things—burlaps, spice sacks, etc., but the thinner ones, such as are used for commercial fertilizer. You can put a bushel in a sack. This year there was an objection, most of the potatoes were green, and the peeling would slip worse handled in sacks than in boxes, and another year, if the crop is green, I will handle them in boxes. I keep the main crop in the cellar, and pit my seed. I have storage for 5,000 bushels. I don't care how deep they are, I put them in five or six feet deep, and put them solid, but if I intend to keep them there all winter, I make little ventilators. I use six inch fence stuff. Take two pieces, nail strips across, and on top of those strips nail another strip lengthways, and set those up there five or six feet apart. If the bin is six feet deep, there will perhaps be five and a half feet dry, and six or eight inches from the top will be wet, and I can't prevent it, except by putting in ventilators.

In regard to the quality of the seed, it makes a difference what kind of seed you plant. I got some seed from one of my neighbors, he had a strain of smooth Empire State, and I bought of him seed enough to plant five acres, and the other five acres in the same field I planted my own seed.

As a result, on the five acres planted with seed I got of him, I had about fifty bushels to an acre, and the other end of the field, with no better chance at all, went 200 bushels to an acre. All the difference was in the seed, they were both the same variety. One had ripened in the summer by blighting. They were not large, and I thought just right for seed, but they had been ripened by some means that injured their vitality. They hardly came up at all. There was no life to them. Sometimes I select, and then plant: or else I take my seed from a place where the potatoes are uniformly good.

Q: What do you do to check potato blight?

Mr. Post: I never have done anything. I have a theory, though, that I shall probably try next year. That is to take one of these strong force pumps, with two sprays, and then, standing on the back end of your wagon, you could cover a number of rows at once. I am convinced that you can wet the ground for a number of rows, and what you waste won't pay for the time it would take to do it in a slower way. As far as treating seed is concerned, I have treated my seed with corrosive sublimate for a number of years. I corresponded with different parties throughout the United States, Iowa, Ohio, Prof. Taft at the College, and different ones, supposed to be the best authorities in the United States. I treated my entire crop this year. I have four kerosene half barrels. I fill bushel baskets half full, make the solution two ounces to sixteen gallons, take a wooden pail, and two gallons of warm rain water, put in the corrosive sublimate, dissolve it, and put in the solution. I keep three of these at a time.

Q: Where the potatoes are inclined to sprout early in the cellar, what do you do?

Mr. Post: All I could ever do was to keep it as cold as I could. But you can keep it too cold. Two years ago I kept the temperature at 33 degrees; I thought that was just right; in the spring, I found my seed was injured. Forty degrees is, I think, about as cool as you ought to keep it. Sometimes I shovel them over.

Q: Do you believe potatoes run out; that is, where the seed is properly selected?

Mr. Post: I do.

Q: Did you ever try air slaked lime in storing potatoes?

Mr. Post: I did, for a number of years; it is a good idea.

FORAGE CROPS.

A. A. CROZIER, AGRICULTURAL COLLEGE.

The short hay crop of recent years, and especially of last year, by reason of the drouth early in the season, has attracted more than ordinary attention to the question of suitable forage crops for this State. This is particularly true of the leguminous crops, for the yield of clover has not only been reduced by the drouth, but the seeding has also failed extensively from the same cause. In addition to this, the clover root borer, which first appeared in this country in 1876, has entered our State and has for several years destroyed a large portion of the clover crop in the southern counties, and has now reached the northern portion of the State as well. The following forage crops have recently received more than ordinary attention in this State.

ALSIKE CLOVER.

This is a hardy species, adapted especially to low, damp soils, either clay or sand. It does not withstand drouth as well as the ordinary red clover; neither is it exempt from the attacks of the root borer, but it is worthy of a permanent place among our forage crops if its cultivation is restricted to suitable locations. Alsike clover is a good kind to sow with timothy, as it matures later than common red clover. Its seed is so small that only one-third the usual amount is required per acre.

CRIMSON CLOVER.

This is an annual species, which matures its seed and dies the same year it is sown. In Delaware, Maryland, and other states, where largely grown, it is sown in summer or early autumn and lives over winter, maturing a crop of hay or seed early the next season. It is therefore a valuable crop to use as a fertilizer, particularly in fruit plantations, since it does not need to occupy the land during the principal growing season. Attempts to grow this clover in Michigan have as yet seldom proved successful, owing to our severe winters. [Later returns are somewhat more favorable.]

ALFALFA.

This forage plant, now extensively grown in the west, is being tested by many farmers in this State. When well established it possesses a remarkable ability to withstand drouth. For the best results the seed should be sown early in the spring without a grain crop, on deep, reasonably fertile soil. If weeds make their appearance, as they doubtless will, both weeds and alfalfa should be cut with a mower in early summer and left upon the ground as a mulch. In following years the crop should be cut for hay as often as it commences to blossom, two or three crops of moderate size being thus obtained in a season.

ORCHARD GRASS.

This is a valuable grass, especially for pasture. For hay it is hardly equal to timothy and needs to be cut early. It will grow on almost any soil and will last longer than most other grasses. Sow not less that a bushel (14 pounds) of seed per acre.

MILLET.

There are several kinds in the market. The largest yield, on good soil, if sown early, is obtained from German millet. Hungarian grass yields somewhat less and requires a little shorter season, but does not withstand drouth as well. Common millet is earlier than either and may be sown as late as the first of July. In ordinary cases this kind will probably give the best satisfaction.

OATS AND PEAS.

These sown together make an excellent forage crop, either to be fed green or to be cured as hay. They should be sown as early in the spring as possible, at the rate of two bushels of field peas and not less than one bushel of oats per acre.

RAPE.

This crop is gaining in popularity. It delights in a fertile soil and a cool moist climate. It is a crop especially adapted to sheep, but may also be fed to cattle, except milch cows. It is always fed green, either cut for soiling, or more commonly pastured. The chief drawback to raising this crop in southern Michigan has been the green aphis, or plant louse, which sometimes attacks the plant during prolonged dry weather, and if not speedily checked by rains completely destroys the crop. No remedy is known, and all that can be done is to commence pasturing at once.

DISCUSSION.

Discussion was to have been led by Franklin Barnhart, but he being absent, the discussion was made general.

Q: What do you know about sacaline?

Mr. Crozier: It is a native of an island near Japan, which has a very moist climate. I have seen plants six to eight feet high. That is about all I know, except that it is recommended as a plant adapted to dry places. This is evidently a mistake, as it thrives best in cool, moist seasons. I cannot say any good word for it, as I have not had much experience with it myself. I cannot say that it is a fraud, because it grows, and stock will eat it, but I do not think it is anything for you or me to sow or plant for a forage crop. It certainly is not adapted for hay.

Q: What about rye for hay?

Mr. Crozier: If you had not said "for hay," I should reply that it was a good thing. It is good for pasture, but it is rather poor hay.

Q: What about millet?

Mr. Crozier: It is an exhaustive crop, but makes good hay.

Q: And sorghum?

Mr. Crozier: It will stand dry weather better than corn, but unless you want it for that special purpose, and are pretty sure of a dry season, you can get a larger crop of better produce from Indian corn.

Q: Regardless of the ear of corn, isn't sorghum better than the corn stalk?

Mr. Crozier: It is harder, and the stock do not like it as well; it is coarser and tougher.

Q: I would like your idea as to the way to proceed in seeding red clover.

Mr. Crozier: If I wanted to be sure, I should sow it as early in the spring as possible, and put no crop whatever with it. That is an extreme measure and not often necessary.

Q: Isn't that the case with all grasses?

Mr. Crozier: I think so, so far as sowing them alone is concerned.

Q: Can you tell us anything about lucerne?

Mr. Crozier: That is the same as alfalfa.

Q: Is there any difference between alfalfa and sweet clover?

Mr. Crozier: Sweet clover lives only two years; alfalfa sometimes twenty years.

Q: What is comfrey?

Mr. Crozier: It looks like burdock. Stock will eat it, but it is rather coarse.

Q: What is the result of spurry on sand?

Mr. Crozier: It will grow on sandy land, and where almost anything else will not, but when land is so poor that you are obliged to grow spurry, I wouldn't try to grow anything?

Q: Do you think rye is of special value to the farmer to turn under?

Mr. Crozier: I think in these hard times it is a good crop to grow, when wheat is low and clover precarious. Rye will grow in the winter time, it is hardy, and a rough and ready plant, adapted to almost all situations. For a fertilizer it is about as good as timothy.

Q: What is your opinion of the manurial value of crimson clover and alfalfa, in comparison with red clover?

Mr. Crozier: In this case it is merely a question of quantity.

Q: Will cow peas grow in this section of the country?

Mr. Crozier: You cannot depend on them.

Q: What kind of a plant is spurry?

Mr. Crozier: It is a little plant with fine leaves, and small white blossoms somewhat like chickweed.

Q: Where you wish to seed timothy and clover, and you put in wheat and timothy in the fall, what time do you put on the clover seed?

Mr. Crozier: As soon as possible after the first of March.

Q: Can clover seed be sown among corn in August or September and cut a crop next year?

Mr. Crozier: Not as a rule. If it comes up in the fall, it will probably be too small to pass the winter. If it happens to be a good season and it gets a good start as early as July, it will be large enough. Much depends on the soil and the amount of snow.

Q: What variety of seed would you advise sowing in this part of the State with oats?

Mr. Crozier: Canada field peas.

Q: You spoke about a beetle that injured the clover roots. Don't you think that if we were to have a wet season the clover would mature in spite of that?

Mr. Crozier: It will produce the first crop of hay, but not the second.

Q: Can you have success with peas on a sandy soil?

Mr. Crozier: Yes, if the sand is good, and you get them in early.

Q: If I sow crimson clover as soon as I can in the spring, will I get a crop of hay this spring?

Mr. Crozier: You will get a crop of clover, it may be six or eight inches high; you won't get much hay.

Q: What time would you sow mammoth clover on heavy land?

Mr. Crozier: If you sow with oats, sow early in the spring.

Q: On low bottom land, wouldn't you expect the clover to lodge?

Mr. Crozier: Not if sown with oats, and the season was dry.

Q: Will not the borer work worse on light ground than on heavy soil?

Mr. Crozier: He will work anywhere where he can get the clover?

Ex.-Gov. Luce: I want to encourage you in relation to the clover. Its loss is a loss to any country or section. Indeed, I know of no more severe loss than that inflicted by the failure of a clover crop in a State like ours. Your questions are judicious, your inquiries are framed to draw out the facts that will aid you. I have been on the alfalfa plains in California. I passed up and down, examining their crops. I saw where they had cut five crops in a year. The roots will go way down and find water, if it is anywhere this side of China, if the ground is soft enough for it to penetrate. But I don't believe clover is gone. Two years ago I went to New York to deliver a lecture, and the questions asked related to how we raised clover in Michigan. The insect had been there, had done his work, and was beginning to go away, and I believe he will leave us.

In forty years of seeding clover, I have never lost a crop until this last year. I have seeded with other crops and without. I lost outright last year thirty acres, and saved fifty-seven. One thing I found an absolute protection to the effects of drouth, and that is to cover the soil with a thin coat of manure. That is, where sowed with wheat. I make a great deal of manure, make it at a loss sometimes, so far as the results of the feeding, but I don't believe we need to be thoroughly discouraged. Try other experiments. Rye is worth something. There is force in the suggestion of the professor that we try sowing the clover without sowing the grain.

Q: Did I understand you to say that alfalfa would not do well on heavy clay soil?

Mr. Luce: With a solid heavy subsoil, I don't believe it will. In California the roots grow large and long, and I know of no reason why it should not be a good fertilizer if you can make it grow. At one of these institutes, a man said he could not get rid of the roots. They were like the old fashioned oak grub roots, but whether there is any danger of that occurring, I don't know; I should not be afraid of it on my farm. I have a slaty subsoil; and I have no faith, from wathching the growth of alfalfa in California and Utah, that it will do anything on my farm. Mine is a gravelly loam, tinctured with lime, and below is a slaty subsoil.

Q: Is it a success to sow clover seed on rye?

Mr. Luce: Yes, sir; rye is better than wheat, take it altogether, and if you can cut the rye early for hay, you will get a good crop. If you let it ripen, it may kill out the seeding.

Q: Does the insect affect the mammoth clover like the common red?

Mr. Luce: Just the same.

Mr. Morrill: The clover root borer has entirely missed me this last year. For the last four or five years it destroyed my crop entirely. Perhaps it starved itself out.

Mr. Brown: For three years we have tried sowing clover without a nurse crop. Two years ago, in a sixteen acre corn field, we sowed our timothy in the fall,and sowed the wheat between the rows of corn shocks. Early in March, we sowed clover seed on a honeycombed surface, and the next fall, when the wheat was cut off, you could look across that field and tell where every corn shock has been. On those spots, there was a nice growth of clover. Sow a little timothy seed in September, and the next spring sow your clover seed. Let the wheat grow. I think you can get a good crop of wheat. The root borer has bothered us frequently; I think this eternally hanging on to a good thing has had something to do with these pests. I think if we would turn it under once in a while, we could get rid of them.

REPORT OF COMMITTEE ON CREDENTIALS.

The following report was accepted and adopted:

Your Committee on Credentials beg leave to submit their report, the following named persons have presented duly verified credentials:

Huron County Farmers' Institute Society—A. L. Wright, Bad Axe.
Allegan Central Grange—L. C. Root, Allegan.
Burr Oak Grange, No. 303—M. A. Dexter, Findley.
Ottawa County—A. G. Van Hess, Zealand.
Rural Grange, No. 37—Frank Chamberlain, Wayland.
Mecosta County Farmers' Institute Society—Albert Winter, Morley.
St. Joseph County Institute Society—B. F. Wilcox, Centreville.
Menominee County Institute Society—Magnus Nelson, Menominee.
Ashland Grange—Wm. W. Carter, Ashland.
Olive Centre Grange, No. 652—John Ovens, Olive Centre.
Rockford Grange, No. 110—C. L. Giles, Rockford.
Crawford County Institute Society—O. Palmer, Grayling.
Lisbon Grange, No. 313—Samuel Stauffer, Roxy Stauffer, Gooding.
St. Clair County Institute Society—Moses Carlton, L. B. Rice, Port Huron.
Glass Creek Grange, No. 425—Mr. and Mrs. C. A. Newland, Hastings.
Tallmadge Grange, No. 639—Fred Brown, Kinney.
Alpine Grange—Mr. and Mrs. T. W. Gibbs, Mr. and Mrs. F. E. Waterman, Mr. and Mrs. W. E. Chambers, Ula.
South Lowell Grange—T. L. Stewart, Alto.
Charlotte Grange, No. 67—James Murray, Charlotte.
Banner Grange, No. 640—Luther E. Hall, Ionia.
Bradley Grange, No. 669—A. B. Congdon, Bradley.
Cascade Grange—H. C. Denison, M. H. Foster, Ada.
Moline Grange, No. 248—J. H. Miller, Moline.
Ensley Centre Grange, J. H. Haskins, Ensley.
Ingham County Farmers' Institute Society and Fitchburg Grange—A. C. Lawrence, Fitchburg.
Sparta Grange, No. 340—Mr. and Mrs. E. S. Dart, Sparta.
Whitneyville Grange—S. C. Peterson, Alaska.
South Haven and Ganges Pomological Society—Mr. and Mrs. Geo. C. Monroe, South Haven.
Clinton County Institute Society and Essex Grange, No. 439—F. W. Redfern, Maple Rapids.
Harmony Grange, No. 387—A. R. Edison, Grand Rapids.
Berrien Centre Grange, No. 14—Thos. Mars, Berrien Centre.
Newaygo County Institute Society—Dr. J. M. Stone, Newaygo.
Hopkins Fruit Growers' Union—J. R. Snyder, Hopkins.
Grattan Grange—Wm. Lessiter, Mrs. Lessiter, Grattan.
Ravenna Grange, No. 373—H. C. Tuttle, Ravenna.
Old Mission Farmers' Club—Mrs. H. E. Golden, Old Mission.
Cascade Grange, No. 63—Mr. and Mrs. John W. Brass, Cascade.
Kalkaska Farmers' Institute Society—Mr. and Mrs. Andrew Palmer, Kalkaska.

Respectfully submitted,

R. D. GRAHAM,
R. FARNAM,
L. J. POST.

WHEATS FOR MICHIGAN.

DR. R. C. KEDZIE, AGRICULTURAL COLLEGE.

What wheats shall we raise in Michigan is important to three classes:

1. To the millers, with reference to the milling quality of the grain, the quantity of flour it will produce, and the merchantable character of the flour.

2. To the farmer, in regard to its hardiness, its productiveness, and the price it will command in the market.

3. For the consumer, the palatable and nutritive quality of the bread it will make. This embraces all classes, because Americans are eminently a bread eating race—are well bred and eat good bread.

In Michigan wheat raising outranks in importance stock breeding, because wheat raisers outnumber stock breeders 16 to 1, and the introduction of a better kind of wheat will benefit the great mass of our farmers. About two million acres are yearly sown to winter wheat in our State, and a wheat that will give even five bushels increase per acre would give us ten million more bushels of wheat, a matter of great significance to our farmers, even with fifty cent wheat.

In comparison with stock breeding, the quick returns and large profit for the small sum expended for better seed wheat, show the greater importance of this wheat question. Michigan is preeminently a winter wheat state. I would not disparage stock breeding, but only call attention to the greater importance of wheat breeding.

Herds may come and herds may go,
But wheat goes on forever
—in Michigan.

A glance at the present condition of wheat raising in our State will show the need of improvement—ten to fifteen named varieties, and some nameless—not one fit to be called excellent, and scarce one true to name. Twenty years ago, the White Clawson was highly esteemed by our farmers, and is still held in estimation by many, but if you examine this wheat today you find five or six different kinds of wheat—white, amber, and red, mixed together—the natural result of using seed wheat threshed by itinerant threshers—an excellent arrangement for mixing the several wheats of a whole neighborhood. I doubt whether a bushel of pure White Clawson can be found in our State unless the seed has been threshed by a flail. No stock breeder would tolerate such "miscegenation" in the handling of his flock.

THE SEARCH FOR BETTER KINDS OF WHEAT.

Is it not time to strike out for new and better kinds of wheat and continue the search till the best is found—best for all classes, farmer, miller, and consumer? In this matter the Agricultural College takes a deep interest. Efforts in this direction were made when the Board of Agriculture imported from Canada seventy-five bushels of Dawson's Golden Chaff, and sent it for trial into different sections of our State, and when

Voigt & Co., of Grand Rapids, imported six bushels of wheat from Buda-Pest, Austria, and had it sown in Kent county. So far as heard from the results are full of promise. But we need to go farther and search wider till the very best is found for Michigan farmers.

HOW TO RAISE THE GRADE OF MICHIGAN WHEATS.

While we are hunting for the best wheat, what shall we do to raise the grade of wheat in our State and make the best of present conditions? Much can be done in this way:

1. Of the kinds now grown in the State, cultivate only the best. It is poor economy to save expense by using cheap seed. I have already spoken of the Buda-Pest, and Dawson's Golden Chaff, which will soon be widely scattered in the State and available for all. These should be introduced at the earliest date. Occasionally a new variety of great promise springs up. Thus an apparently new kind of wheat was raised last season in the town of Gaines, Kent county, which was said to have given an average crop of 42 bushels per acre on 40 acres. The farmer called it White Clawson, but Mr. Voigt, who called my attention to it, says it is not White Clawson, and Robert Gibbons, of the *Michigan Farmer*, agrees with Mr. Voigt. It is a bald white wheat, with a stalk and head resembling White Clawson, but the berry is very hard and flinty, the cut section of the berry clear and glassy and without the starchy appearance of White Clawson, and in chemical composition it differs greatly from Clawson. Knowing nothing of the history of this wheat, but satisfied that it was not White Clawson, I have given it the provisional name of Corinth Clawson, from the name of the village near which it was grown. Prof. Smith tried to get some of the wheat to test on the College farm, and disseminate through the State if it maintained its high reputation. He wrote repeatedly to the farmer, but got no reply, and finally sent Mr. Crozier, who got a small quantity of the seed, which was sown here. Most of the Corinth crop was sold for seed in the immediate neighborhood, and it is probable that the seed can be obtained in that vicinity for next fall's sowing.

2. When promising sports appear, like the single stool of wheat that gave us the White Clawson in New York, and the Dawson's Golden Chaff in Canada, test them thoroughly and cultivate them if they promise well. The Dawson's Golden Chaff, on the experimental farm at Guelph, gave an average yield of 48.7 bushels per acre for four years.

3. Keep the seed pure, and thresh all the seed wheat with the flail. I have spoken of the mixing of wheat by the threshing machine. Another evil is that rye is thus becoming mixed with wheat, and no process of screening will separate rye from wheat, but the presence of rye in any considerable amount will ruin wheat for production of a high grade flour. A farmer in Genesee county always threshes his seed wheat with the flail and has kept his White Clawson pure and "as good as it was twenty years ago." Much of the running out of wheat may be due to mixing seeds.

4. Try the best foreign varieties raised in a climate similar to our own. When in Washington last August, I visited the Department of Agriculture in search of any foreign varieties of wheat for our farmers in

Michigan, and finally found in the Department of Vegetable Pathology (!) a clerk (W. A. Carleton, graduate of Kansas Agricultural College), who had in charge some promising Russian wheats, and some cross-bred wheats from Australia. He had no ground on which to sow these wheats, and was at a loss what to do with them. After some correspondence I secured thirty kinds of these foreign wheats, somewhat late in the season for sowing, and it was a question whether it would be wise to sow them so late in the season. But a self-appointed committee of those interested in this wheat question, consisting of Pres. Gorton, Sec. Butterfield and Prof. Smith, looked over these wheats with me, and ten of the most promising kinds were selected and sown on October 14, on the College farm, under the care of Mr. Crozier. Specimens of these wheats were reserved for analysis and comparison with next year's crop, and are here exhibited. They are rich in gluten and give good promise.

In addition to these, Prof. Smith imported two wheats from Germany, the Schilf and Count Waldersdorff.

The new wheats will be carefully tested with regard to their *hardiness*, *productiveness*, *milling quality*, *bread-making properties*, and especially in regard to the *persistence of these properties*. This last subject is of great importance.

The following tables exhibit the composition of the kinds of wheat formerly in cultivation in this State, and the new wheats that are now on trial at the College:

Old varieties of wheat raised in Michigan.

	Names of varieties.	Water.	Ash.	Total nitrogen.	Crude protein.	Carbohydrates and fat.
	Diehl	10.86	1.66	1.92	12.02	74.46
	Lincoln	13.38	1.56	1.90	11.90	73.16
	Fultz	11.45	1.74	1.86	11.59	75.22
	Treadwell	9.94	1.80	1.87	11.69	76.58
	Buckeye	12.73	1.38	1.76	10.97	74.92
	Tappahannock	11.21	1.77	2.17	13.56	73.46
	Lancaster	11.93	1.82	2.24	14.00	72.25
	Gold Medal	10.33	1.87	1.92	12.10	75.69
	Egyptian Red	11.48	1.69	1.79	11.19	75.64
	White Clawson	11.33	1.68	1.90	11.87	75.07
	Tuscan	13.77	1.72	1.82	11.37	73.14
	Soules	11.02	1.73	1.89	11.81	75.44
Richardson.	American Bronze	13.17	2.05	1.89	11.81	70.75
	Jones' Winter Fife	13.15	1.75	2.01	12.56	70 27
	Red Clawson	13.20	1.84	1.67	10.44	72.02
	Reliable	12.80	1.85	2.12	13.25	69.73
	Rudy	12.95	1.99	1.85	11.56	71.30

New kinds of wheat.

Names of varieties.	Kernels in 10 grams.	Moisture.	Fat.	Crude fibre.	Ash.	Total nitrogen.	Albuminoid nitrogen.	Amide nitrogen.	Albuminoids.	Carbo-hydrates.
Buda-Pest, Imp.	301	10.97	1.56	1.84	2.23	2.16	2.04	.12	12.75	69.90
" " 1st year	250	13.10	1.63	1.82	2.09	2.11	2.01	.10	13.18	68.18
" " 2d year	380	10.95	1.83	1.97	2.00	2.41	2.25	.16	14.06	68.19
Dawson's Golden Chaff, Imp.	262	11.22	2.29	2.35	1.88	1.68	1.63	.05	10.19	70.96
" " " 1st year	308	10.30	2.10	2.17	1.61	2.58	2.53	.05	15.81	68.19
White Clawson	290	10.00	2.92	1.83	1.95	1.90	1.71	.19	10.69	80.81
"Corinth Clawson"	281	10.98	1.94	1.97	1.85	2.32	2.16	.16	14.50	68.76
De Teisse	238	9.13	1.96	1.98	1.76	2.17	2.11	.06	13.18	71.61
Krinsh	270	9.63	1.68	2.20	1.84	2.56	2.49	.07	15.56	68.65
Grey Winter	263	9.49	2.06	1.93	1.34	2.64	2.55	.09	15.94	68.18
Red Bearded	286	9.06	2.00	3.08	2.00	2.56	2.52	.04	15.75	67.86
Chernokoloska	250	9.63	2.20	2.00	2.10	2.73	2.59	.14	16.19	67.01
Arnautka	262	8.49	2.11	2.16	1.92	2.62	2.51	.11	15.66	68.95
Banatka	266	9.33	1.87	1.99	1.95	2.45	2.42	.03	15.12	69.55
Kujavka	262	10.00	2.00	2.21	1.73	2.13	2.09	.04	13.06	70.75
Kubanka	300	10.14	1.79	3.05	2.20	2.13	2.10	.03	13.12	69.51
Belaturka	319	9.93	2.08	1.95	1.95	2.51	2.35	.16	14.69	68.40
Waldersdorff	225	10.65	1.96	2.08	1.71	2.27	2.11	.16	13.18	69.41
Schilf	210	10.56	1.97	1.82	1.93	1.86	1.83	.03	11.44	72.10

One most important question to be considered in regard to these foreign wheats is whether their excellent qualities are so inherent in the grain that they will persist through long periods of cultivation, or are they mainly climatic, and to disappear in a few years of cultivation? This is a question of vital importance to the farmer and the miller. We can afford to import seed, but not climate. The Buda-Pest wheat and Dawson's Golden Chaff stand this test well, as will be seen by a glance at the tables. This testing of the lasting quality of these wheats must be vigorously followed up for a number of years until they become acclimated and their persistent excellence well established. If they soon run down in our soil and climate, that's enough, no matter how good when they first arrive.

So also the productiveness must be well established. If the wheat tillers well and sends up a large number of fruitful stalks, like the Clawson and Dawson's Golden Chaff, well; but if it sends up only a few stalks and a moderate crop like the Lancaster, no matter how good the grain for the miller, the farmer will not continue to sow it.

COMPARISON OF RELATIVE STRENGTH OF WHEATS.

Tables of analysis often convey little information except to those who are accustomed to study tabular results. To enable a person to readily compare the most important element in the composition of these several wheats, the following diagrams have been prepared to show at a glance the relative strength or quality of albuminous materials in the kinds of wheats named, both the older varieties and the newer kinds now being tested on the College farm.

In both diagrams the same scale is used.

Diagram showing the relative strength or albuminous material in the several kinds of wheat.

No. 1, THE OLD VARIETIES.

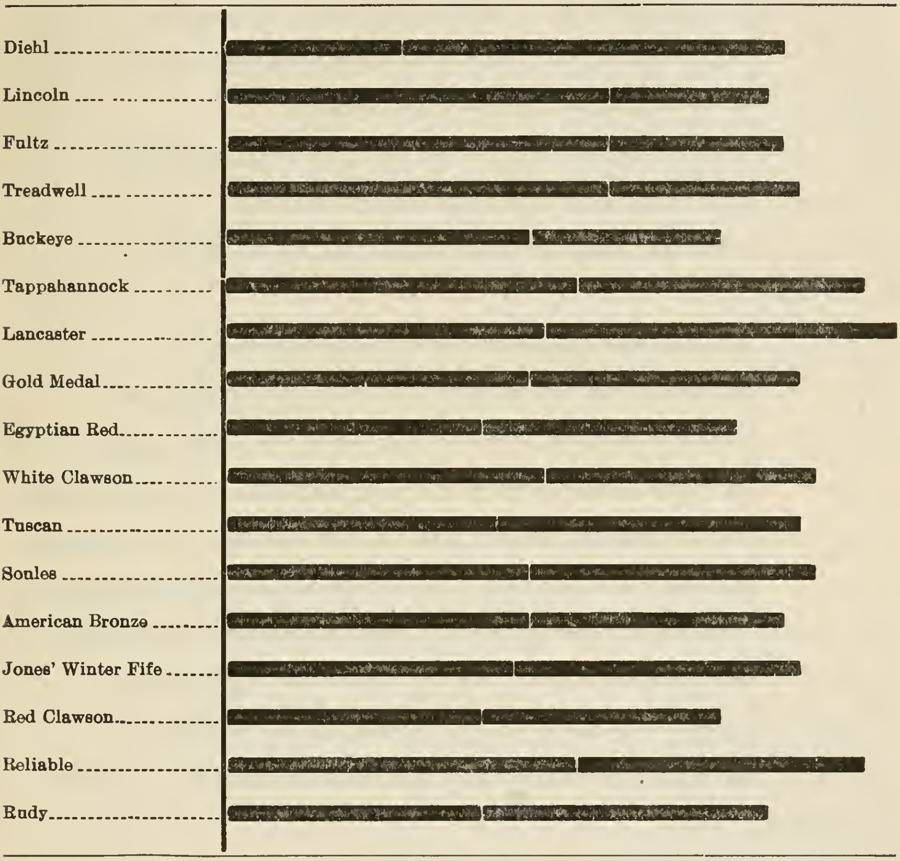
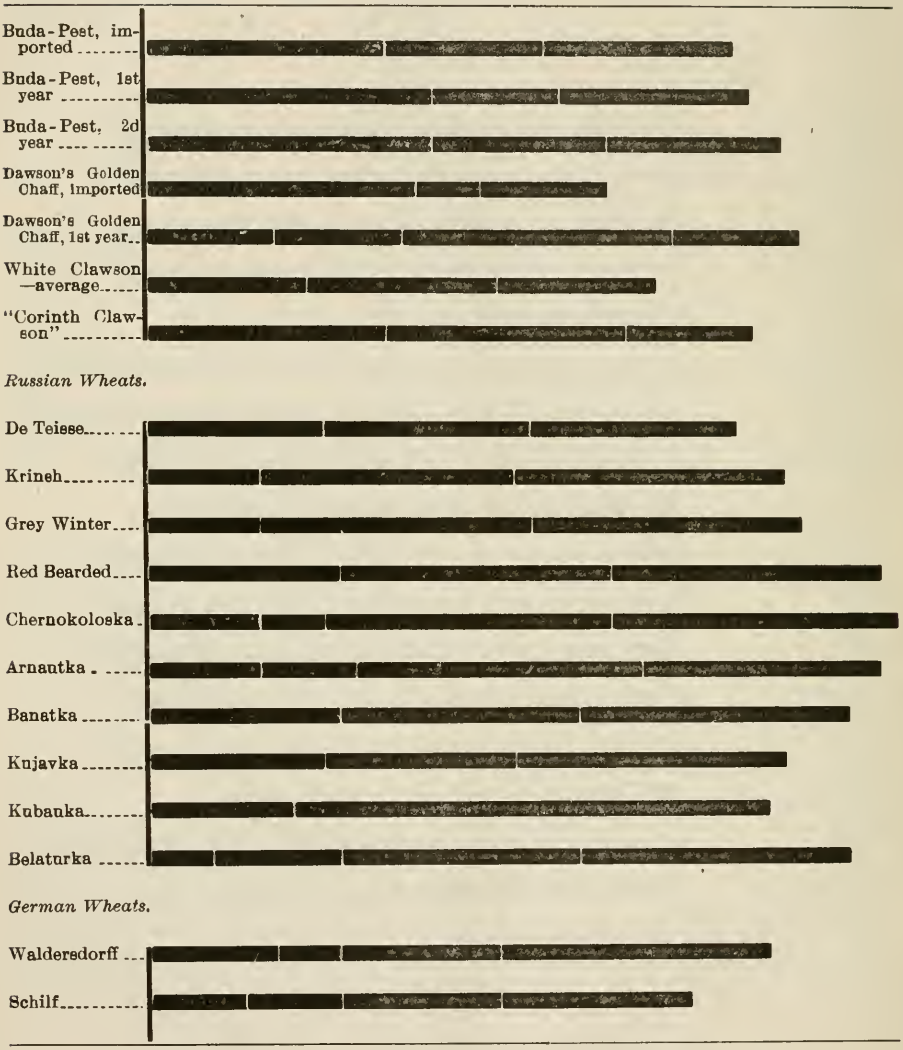


DIAGRAM No. 2, NEW KINDS OF WHEAT.



WHEAT BREEDING.

Wheat breeding is as legitimate a business as stock breeding, and the same general principles apply to both. Some of our improvements in wheat have been secured by cultivating "sports," or accidental variations of marked character, as in the single stool of wheat found in New York, or the stool of wheat found in Paris, Ontario, by Robert Dawson, that gave the world the Golden Chaff. The stock breeder has found in "sports" or variations from the normal type in his stock, the opportunity to start a new type or breed of stock. The wheat breeder has depended largely upon selecting variations from usual type, and promoting by further selection and cultivation these variations of desirable qualities.

The stock breeder avails himself of these individual variations, selecting and promoting those most desirable. But in addition to variation and environment, he has introduced more powerful influences by cross-breeding of his animals—a most efficient cause of variation. But the wheat breeder has made little use of this method, and there is good reason for this. Cross-breeding in animals is easily secured, but the structure of the wheat head is such that it is difficult to secure cross-breeding, and accidental or natural cross-fertilization is rare in the wheat plant, though very common in corn. But cross-breeding to secure the points of excellence in two varieties of wheat appears a most promising field for improvement of this grain.

CROSS-BREEDING IN AUSTRALIA.

Mr. William Farrer, of New South Wales, has turned his attention for several years to cross-breeding wheat, particularly to develop a rust-proof wheat for Australia, and has been very successful in his efforts. Having had some correspondence with Mr. Farrer on the subject of improving wheat a few months ago, I received from him ten cross-bred wheats, all of them the first year's growth from the cross. He used the Improved Fife as the parent stock in nine cases, and crossed this with some promising wheat of another kind.

There was about a teaspoonful of each kind of cross-bred wheats, and they all looked promising. These precious seeds were placed in the hands of Prof. Smith, who planted them separately, and placed them under the care of Mr. Crozier. Each kernel will produce a stool of wheat, which will be gathered and examined separately. We will thus have 300 or 400 separate specimens of wheat, out of which we may find thirty or forty kinds worthy of further testing. We shall probably find some new kinds of wheat, and possibly varieties of great value. It will require some years of cultivation to *fix* the character of any of these new varieties. It is a lottery of nature in which we may draw nothing but blanks, but we hope to draw a prize for the farmers and millers of Michigan.

DETERMINING THE MILLING QUALITIES OF WHEATS.

Suppose we have twenty or thirty kinds of wheat from this or any other source, how shall we determine early in the history of their cultivation the milling quality of the several kinds? Must we wait till we can spare twenty bushels to make a satisfactory test in a steel-roller mill? If we could satisfactorily determine the milling quality and commercial value of such wheats early in their course, when we can spare only a pound or two for such purpose, we might not only save time, but early throw out of cultivation the kinds that had little excellence, and bring to the front those of great promise. For this purpose we need a toy or baby roller mill such as they use in New South Wales, having five breaks and five smooth separator rolls, whereby one pound of wheat may be ground and separated the same as in our steel roller mills. Such a toy roller mill was made by Ganz & Co., of Buda-Pest, and used by F. B. Guthrie in New South Wales last March (1895).

If our College Experiment Station and the Michigan Millers' Association would combine their forces, and secure a miniature plant of this kind to test the milling quality and commercial value of all new wheats, the agricultural interests of our State might be greatly benefited, and the milling interests placed on a more reliable basis.

FRIDAY EVENING.

TAXATION.

PROF. W. O. HEDRICK, AGRICULTURAL COLLEGE.

Taxation, like its frequent product, the poor, we have always with us. Its development suggests the history of piracy or robbery; governments, like the burglar, ever devising new means to plunder; subjects, like the plundered, ever devising new ways to escape. In Michigan it is legislated upon at every session of the legislature, yet there seems to be more complaint against our taxing system at the present time than ever before. Within the past twelve months farmers' clubs and city mayors have united in asking relief from taxation, boards of supervisors have had unusual difficulty in making their equalizations, and a tax statistician has been appointed to investigate the operation of our system. Nor are these difficulties transient and local. Within the past ten years almost every northern state east of the Mississippi has had a tax commission appointed to examine the deficiencies of their unsatisfactory system and to suggest remedies therefore.

Much of this complaint no doubt is due to the difficulty in paying taxes within recent years, but increased business on the part of the government ever requires increased taxation, and that this burden may not become unbearable, change, readjustment of the load, and improved methods of administration are necessary.

THE MICHIGAN SYSTEM.

The State of Michigan, with its townships, counties and cities, like nearly every other state in the union, gets most of it's revenue from one source—the general property tax. It is a tax upon all property whatsoever, real or personal, except that expressly exempted, and brings into the State treasury two-thirds of the required revenue each year, and into the county and township treasuries practically their entire supply. Its history in this country is not extensive. It was hardly known in the time of Washington, and its present development was not reached until the civil war. It is thought to be peculiarly equitable in form, since it seeks to tax all property, wherever found, at a uniform rate. Much as this tax is used, however, it has been bitterly condemned. It has been called an inquisitorial tax, a tax on honesty, a tax so iniquitous that every civilized nation has discarded it except our own. The leading writer on taxation in this country says: "The general property tax, as administered in this country today, beyond doubt is the worst tax in the civilized world." Another says: "Words cannot be found sufficiently strong to express the just criticisms that can be made against it."

Let us examine the accusations brought against this tax upon which we are so dependent, note its faults, and consider the remedies suggested for them.

CRITICISMS ON THE GENERAL PROPERTY TAX.

The tax is first criticised because it allows personal property to escape taxation. In theory the tax burden is borne by both kinds of property—personal and real. In practice personal property is hard to find and escapes assessment, while real property, being easily seen bears the burden intended for both. It is everywhere asserted that personal property in the shape of bonds, stocks, moneys, mortgages and merchandise escape taxation, and probably no one doubts longer that such is the case. In Ohio, under a rigorous tax spy and sworn property list method of searching for this kind of wealth, a recent tax commission reports that "while half the wealth of the State is personal property, only a mere bagatelle pays taxes—something like four-fifths going untaxed." The amount of personal property on the assessment rolls of states where estimates have been made has grown steadily less for years. In 1866, Cincinnati returned for assessment $67,000,000 of personal property. In 1892, twenty-five years later, this amount had decreased to $45,000,000 on the assessment rolls. Real property during this same time had risen in assessment value from $67,000,000 to $144,000,000. In the State of New York, the home of the capitalist, the assessed personal property in 1869 was $430,000,000. In 1875, it had fallen to $407,000,000. In 1885, to $332,000,000—a decline of $100,000,000 of reported personal property during a period of great railroad expansion and general prosperity. During the same time real estate was advanced in tax paying ability from $532,000,000 to $762,000,000, or an increase of $230,000,000. In the whole United States, the assessed value of personal property decreased from $5,101,000,000 in 1860 to $3,866,000,000 in 1880, real estate on the other hand making proportionate rise. It is for these reasons that the farmer claims that he pays more taxes than he should. So much evidence all tending the same way makes incontestible the claim of the land holder that he is bearing the taxes intended for all.

Another objection to our taxing system is that

IT ENCOURAGES UNEQUAL VALUATION,

as between one locality and another. The entire amount of State and county taxes is levied upon the townships of this State in proportion to the value of property each contains. No greater inducement could be offered the assessing officer having the interests of his neighborhood rather than the interests of the State at heart, to undervalue property and shift the burden of State and county taxes to other townships than his. Real estate in almost adjacent counties, like Allegan and Berrien, differs in assessed value as much as eight dollars per acre, while the same differences are permitted between townships within a county. The law, it is true, seeks to remedy this defect by requiring that all property be assessed at its real value, but assessors do not comply with the law. The Auditor General's tax superintendent in this State estimates that one-half the property of the State goes untaxed because the personal property escapes taxation and the other property is undervalued. A supervisor in Ionia county recently published this statement concerning an equalization quarrel in that county: "My claim was and is that Ionia City, Portland, Saranac, and all the other villages, together with the farming lands of the county, were assessed at full eighty per cent of what they would sell for (the law says we should assess for full cash value, but we have a chance to err in our judgment), and that Belding City was not assessed on any property over forty per cent, and in some cases not over ten per cent, of its cash value." This statement shows the differences that may exist in valuing property, also the method by which assessors accomplish the result. The law in this State further encourages the undervaluation of property by making the assessing officer elective rather than appointive. His stay in office and further political promotion is directly dependent on the ballots of those whose property he values. He encounters a strong temptation through the law to value property lightly, and keep his constituents good humored at the expense of the State.

UNDERVALUATION.

Judge Maxwell, of Bay City, before whom a supervisor was recently convicted of undervaluing property, makes this statement: "Since 1843, the supervisor has been tried as an assessing officer, and for fifty years it has been demonstrated that the supervisor will not make an honest assessment. The system of equalization by the board of supervisors holds out constant temptation to him to violate his oath and pervert his duty by valuing the taxable property too low. In fact, as a man, he hopes that by low valuation he will save something to his constituents, and he favors those who elected him. On this favoritism of his immediate neighbors depends his further political hopes." Little betterment of tax conditions can be hoped for while assessors are responsible to the tax payers for their positions, or the State leaves so much chance for one township to shift county and State taxes upon another.

MORAL EFFECT OF THE SYSTEM.

The last objection is found in the moral effect of our system. It is said that judging from tax returns, the clergymen are the greatest property holders of the country, they being too honest to falsify their statements. Most men desire to pay their full share of State expense, but no one wants to pay his neighbor's. Indeed, competition is so close in some businesses that a man cannot possibly pay his taxes if his neighbor does not, and succeed in business. Our system of taxation tends to bring the morality of a community down to the level of the most unscrupulous, because, feeling that other men are not making full returns of their possessions, most men are conscienceless about their own. A wise taxing law should not make truthfulness so difficult.

Besides these vital objections to our taxing system, there are others of minor note. As the main source of revenue to the State, it allows too many citizens to go untaxed. Unless a person owns property more than is exempt by law he makes no contribution to the State whatever, except a paltry poll-tax. It is generally considered that a fourth of our bread earners belong to the professional classes—lawyers, teachers, doctors, etc. Why should not these persons make some contribution to government, which protects and frequently educates them?

The collecting machinery under this tax system is hardly less troublesome than the assessing. How frequently in the poorer parts of the State does the town treasurer report no property to be levied upon for securing taxes, and the State loses revenue and is encumbered with worthless real estate thereby! Tax officials in this State declare that after a tax is levied on only a part of property, and that undervalued, it is still exceedingly difficult to collect it.

Still more injustices promoted by our tax are the unequal assessments as between one individual and another, the exemption of the poor for political purposes, and the double taxations which are necessary in many instances, or the State loses revenue trying to avoid them.

THE SINGLE TAX.

Among the schemes for tax reform, few have been more warmly and enthusiastically supported than the single tax. It is the frequent conclusion of taxation students that no relief can come until all taxes are simplified into one. At all times the theory has been that, while a tax is collected from some one commodity, this in turn shifts the tax to other commodities, until the whole is diffused equitably throughout the community. Just as at present, an increased excise tax on liquors is not borne by the manufacturer alone, but is shifted by him, through an increased price, upon those who use the commodity. A variety of objects, such as incomes, houses and lands, have at different times been suggested as the bearer of this tax. No tax is theoretically so fair as the income tax. It marks almost exactly the ability of a person to pay taxes. It is an elastic tax. It leaves every one relatively in the same position after paying the tax as before paying it. Practically, however, it is open to much criticism. It is a tax on the conscientious; is inquisitorial, and has the added fault for State purposes of taxing incomes made in neighboring states from property already taxed there. The single tax on land is commended because it taxes something easy to find, but is condemned because it cannot be easily shifted, and hence the land owner must bear the tax alone. No subject has yet been found that fully bears out the theory of the single taxer.

SEPARATION OF STATE AND LOCAL TAXES.

The most widely and plausible urged plan of reform is the separation of State from local taxes. Let the State get its revenue from one source and the townships and counties secure their revenue from a different source, and the chief incentive to illegal valuation of property will disappear. No principle of local self-government will suffer from this change, but the State will abandon a clumsy, inefficient method of tax collection for a better one. Specific taxes on corporations, inheritance taxes, and taxes on natural monopolies, are recommended as sources for State revenue, while real estate and tangible personal property should be taxed by local governments alone. Michigan has already most of the machinery for this plan in the specific tax laws by which a third of her revenue is at present raised. Pennsylvania uses the plan completely, and is conceded to have the best tax law in the union. Both in theory and in practice, the separation of State from local taxes seems feasible and proper.

Another reform is effected when the taxing officer is made responsible to the whole district for which he raises revenue. Even with State taxes eliminated, there would be contentions among townships, and between city wards and country townships, over the distribution of county taxes, unless the taxing officials could be elected for the whole county, or better still, be appointed. County assessing officers are everywhere commended in states where the system prevails, and are fully endorsed both by students of taxation and practical men. The best recommendation for any tax system is that it can be believed in, and no tax reform is successful that cannot be endorsed by those who pay the taxes. It was formerly said that the best taxing system was one "by which the geese were plucked with the least amount of squaking." The history of taxes shows that they were once the product of force—extorted from unwilling subjects, who developed great ingenuity in avoiding them. The modern idea of taxes is that they are the contributions of citizens for the support of government, according to the ability of each to pay. That, far from being an unmitigated evil always to be shunned, they should be encouraged, promoted, looked upon as a benefit in the same sense that while one man's means would go but a short distance in securing to him the blessings of civilization, the small contributions from many citizens in the form of taxes will secure these blessings to all at a trifling cost to each. In this sense a tax may become one's best paying investment if cheaply, equitably and properly exacted.

To sum up these statements, our taxing system is defective—

1. Because it allows personal property to escape taxation.
2. Because it encourages illegal valuation of property.
3. Because it promotes dishonesty.

The most feasible remedy suggested is to separate State from local taxes, and to make the taxing officials elective county officers, or still better, appointed ones.

Report of Mr. Rice, chairman of committee on exhibits, was accepted and adopted.

THE FARMERS' CONTRIBUTION TO SOCIETY.

EX-GOV. CYRUS G. LUCE.

I might say that agriculture furnishes the basis of the nation's prosperity, and go on. But it seems to me that I can fasten your attention better, and present it in such a way that it will cling to your memories longer, by going into detail. The newspapers say—it is one of their headlines—"Agriculture is the basis of a nation's prosperity." It is true, but how is it that we furnish the basis and bulk of this nation's prosperity? Well, now, I am going to illustrate in this way: Society is a great partnership concern; it embraces all the interests of all the people in this great country. Seventy millions of us are in partnership in running the race of life. Each is supposed to contribute something to the partnership. It is a joint stock company we are engaged in, and we all are stockholders.

Now the farmers contribute a large share of this stock. I apprehend there will be a variety of opinions in relation to how much of this stock belongs to the farmer. How much to the welfare, how much to the security, how much to the wealth, do the farmers contribute, of these 100 shares? I am going to be modest in my claim, and say to you that the agriculture of America contributes 60 per cent of this stock. Sixty per cent of the capital is raised through the faith and industry of the farmers —wrung from the brown soil. Let us see where it goes. What is the first great need of humanity? The first essential of life itself? It is food. I took dinner at a wonderfully fine hotel in Detroit a little while ago. There was everything on that table that could tempt the appetite of a human creature, meats, vegetables, breads, fruits. Every single one of these was a farmer's contribution, which had grown on the farm, somewhere. What is the next essential to human life and its enjoyment? We wear clothing to protect us from the cold or from the heat, and for adornment. Let us start with the wool; that is the most essential point. Some men ought to be ashamed to mention wool or sheep, but after all it is an agricultural contribution, and we contribute it under great difficulties. Or perhaps you wear cotton. That is also a farmers' contribution. Our brothers in the south till the soil and raise the cotton, from which is made the cotton clothing we wear. Most of us wear a little linen. Linen is essential to society and we must have it; linen is an agricultural contribution. On the plains of Dakota and Kansas they are raising flax—hundreds and thousands of acres of flax. An agricultural contribution to society. Well, then, we come along to our shoes—a farmer's contribution. How would we get along if we were compelled to go barefooted, and where would we get material to construct boots and shoes of, if farmers didn't contribute it?

But I will treat it from a broader standpoint now. I will get away from the individual, and see what it is we contribute to the prosperity of the great whole. What it is that has enabled us to glory in the splendor of our achievements, in the one hundred or more years that we have lived here? Whence has come the wealth which has constructed the mammoth blocks, the churches whose spires pierce the clouds, which has enabled America to march on and on, and become the marvel of the civilized world? It is the farmers' contribution to the country. It is the 60 per cent of the stock which you own. It is the farmers' contribution which has enabled men to go out and prosecute business with success, and has secured to them luxury, wealth, comfort, power and strength. Even now, before harvest, there are spies, and I do not say it disrespectfully, out among the wheat fields of the west, to see what the prospects are for the coming crop of wheat. They look around, why? Do they care for your welfare? No; they are looking to see what the business prospects are. To see how much they had better venture. The railroad men have their men out, spying out the land, to see how much of the honey and dew they are going to reap from the efforts of the farmer in cultivating the soil. They rely upon it, and in this very city manufacturers in certain lines, way up on the roll of manufacturers, sell to dealers in the smaller towns, who must, for their local trade, rely upon the farmers and outlying agriculturists. The farmers' contributions to the merchants' sales.

Three weeks ago I was in Chicago, and I took the train home at Grand Crossing. While I waited there, half an hour, twelve long, loaded trains passed. I bought a paper containing the address of President Baker, who had just been elected president of the Chicago Board of Trade for the fourth time. The power of that Board of Trade over commerce is indescribable. That Board of Trade, reaching across the broad Atlantic to Europe, passing over to California, and across the broad Pacific to Asia, Africa, and all the countries of the old world; it is a most powerful organ, stronger than the Senate or the House of Representatives. It reaches every interest, that mighty Board of Trade; we see they put up prices and put them down again, and I read Mr. Baker's speech with interest. Mr. Baker said that commerce was the life and foundation of this country, and that every other interest should be subjected to the welfare of commerce. That commerce gave the country its strength, that commerce gave it its glory, that the laws should be adjusted to meet the demands of commerce. I thought, are these things so? and as train after train went by, I thought, from whence come these things and where do they go?

Oh, the Board of Trade could not live thirty days without the farmers' contributions to that Board of Trade. Supposing the farmers stopped their princely contributions to the Board of Trade in Chicago for thirty days. They would be astonished, staggered, scared; the manufacturers would begin to scatter, and in a year the cars would rust on the tracks, and the vessels would rot at the wharves.

Oh, my countrymen, think well of your calling, which is of such prime importance to everyone else, and it ought to be to you. The farmer *always* precedes commerce. The men who came into Kent county to become farmers, came here when the woods covered the country. They blazed the road for the commerce which followed. They furnished the loads for commerce to handle. They make the wealth for commerce, and still Mr. Baker, who stands deservedly high, says that everything should be bent to encourage the interests of commerce.

Now to pass on. I was in Chicago once, when it was the most doleful sight the eye of man ever beheld. It was just after the fire, and it was a mass of ruins. No man has ever described it. No human being could, no imagination could realize, no pen recall the awful sight that met the eye. It looked as if, and people felt as if, it were time to write: "History is closed. It came, it flourished, and it went up in smoke." In two years Chicago had arisen, phœnix-like, from its ashes, higher, broader, grander, richer, stronger than before, and how? It went up there on the profits made from pigs and corn. Those rich, fertile valleys back of Chicago, in Illinois, Iowa, Kansas and Nebraska—all that country contributed to its growth, and rebuilt that magnificent, unparaleled city. It was the farmers' contribution; they might have waited there until doomsday, praying for commerce to come, for manufacturers to come and build them up, if agriculture had kept in the background, and had not turned its wonderful contributions in their direction.

When we get the balance of trade in our favor, it is the farmers' contribution that does it. In 1892, we exported from America to foreign lands, one billion, thirty million dollars worth of property. Now what was the farmers' contribution out of that? Mind you, I have claimed 60 per cent of this stock, but we have 78 per cent of the stock in the exports that went from this land, to force a balance of trade of 202 millions, back in our favor. We contributed, from the farms, almost eight hundred of that thousand millions, by our faith in the soil, our faith in God and the march of the seasons in the farming of the land. By your industry, you wrung from the ground enough to feed this nation, and to send abroad eight hundred millions of property.

I am with you tonight to leave with you, perhaps, the last speech I shall ever make, to impress upon your minds the importance of the calling in which we are engaged. I have talked to you about what we are doing—our share in the exports. And not only in this direction, are we contributing, but all the while, in every department. Let no man sneer at your calling or make you think one particle less of it.

But what is the grandest of all the crops? The boys and the girls that are raised on the farms. They grow up and go into the cities, and form the best business men we have, and there are some things that we on the farm have reason to be thankful for. Before me tonight are some farmers' wives, and mothers, with their children; let me say a word of encouragement to you. We do not contribute to some things, in proportion to our numbers. For four years I visited the Industrial School at Lansing, as often as once a fortnight. I have taken those boys where there were a hundred or fifty of them, and talked to them. I would say, "Boys, I want every one of you who came from a farm to raise the right hand." I never yet found over three in a hundred or two in fifty there that came from the farms. The usual average is two in a hundred; out of 500 boys, ten came from the country and 490 from the cities and villages. But I am here to say to the mothers of the farmer boys, that your boys do not suffer the temptations that boys in the town do. They have the mother's affection and guiding hand to buoy them up, and because the city boys are ranging at large, and the gilded saloons are open, and crime is so broadcast, and the many temptations, because of this difference, the country is able to contribute better blood and stronger intellects than the city, on the average.

Only ten in a hundred; that proportion won't hold good in the prisons —I have tried that, too. But we don't contribute anything like our share, and I hope there isn't a person before me who regrets that lack of contribution.

It has been said, "Give me good agriculture and I will give you good politics." There is a lot of philosophy underlying this. It is one of the places where agriculture does not contribute as much as it should, it does not contribute as much to the forces which control the country, as its 60 per cent of stock entitles it to.

A man is not your friend who tells you that you are bound hand and foot; it is not true, and if it were true, I am not quite certain that he would be your friend to be telling you of it. I have always been hoping for more confidence, and in these institutes, held under the auspices of the Board of Agriculture, I look for great things. They will help to spread true knowledge over the country, hoping it will stimulate to better action and furnish a means by which we can concentrate our forces. Yet there is little in routine farm work to stimulate the mind. I have a 300-acre farm, and I have plowed that farm all over, myself; part of it, several times. There is nothing in that plowing that stimulates the mental activities. I get the horses out, harness them up, run my fingers up and down beneath the horses' collars, and see that the collar is smooth and all right; I snap the lines and the tugs, place the line over the right shoulder, under the left, and feel a little serious. I chirrup to the horses. They start up seriously. I, being a Yankee, kick the furrow with the right foot; if I have a Dutchman, he wants to kick with the left. There is nothing about that that stimulates mental activities. When I hit a stone, my mental activities are aroused; but around we go, round and round, and the satisfaction in it is, that we have succeeded in turning over quite a breadth of land, and we go home pretty well satisfied at night, with a good appetite. This is first rate, but I tell you that somehow, the farmer has got to have extraneous matters to stimulate the intellect.

We have reached the place where the brain must do the work, and the muscles can rest more and more, and while we are resting, we ought to be devising a way to stimulate the mental activities. Knowledge is power. That was said before I was born. That is more true today than it was fifty years ago. More emphatically true, and we need it.

There is another thing about the farmers. They look at the dark side. Let us look, instead, with bright eyes and earnest desire and hope, for the silver lining that is said to underlie every cloud. Let us give thanks and rejoice that things are as well with us as they are. Gather all the information you can.

Another thing, contributing as we do, proud as we ought to be of the contributions we are able to make, kind as the Ruler of all is to us, we are not loyal enough to our calling.

I was once the guest of Prof. Vaughan of our University, and they invited me to attend a club meeting that night, composed of President Angell and all the professors, I guess. There was a paper read at the meeting; it was not as interesting as the paper I listened to last night by Sister Hinds—it was not as good as that—but they listened to it quietly. It was on some scientific subject. After the paper they had a little banquet, some blue points and some lunch, and we all gathered around the table. There were three Massachusetts men there, one a Harvard or Yale College man, and two from Boston—educated men, all of them. They had never been west, and were real typical Bostoners. This was in the winter of '94, the fair at Chicago had closed the first of November, 1893. These men had been to Chicago, and if ever I heard anything eulogized, it was when those men from Boston spoke of the Exposition and the surroundings there. They eulogized it in the choicest language and the strongest terms, its conception and execution. It seemed to *surprise* them more than anything else. Well that fair *was* wonderful. I was there pretty early in May, and when I got home I couldn't describe it. When asked what I saw, I couldn't tell them anything about it. Could you?

And so they talked about it a little, and every once in a while a Boston man would say, "I was overwhelmed with astonishment," "It brought honor to Chicago," "How a city so far from the seaboard, so far from Boston could ever conceive and construct and execute such a thing, passes my comprehension," "It is the most wonderful thing I ever met," "I know nothing in history equal to it." He turned to President Angell and said, "What is your solution of their achievements?" He replied, "I will tell you." The doctor got upon his feet; you know what a handsome speaker he is, polished in his manner, not as decided as some people, but a strong speaker, and he went on and eulogized it a little. He didn't come up to the Boston man, though, and he said, "You want I should tell you what is my solution of the causes that led up to that achievement, an achievement which did so much honor to the country and the city of Chicago? Chicago will quarrel about its religion, it will quarrel wonderfully on politics, it will attack with great vigor its officials, they will fight over some internal matter, but the moment you touch Chicago *as Chicago*, every man, woman and child in the city will rally to its defense and support and upbuilding."

That is practically his thought. He said, "Chicago is enthusiastically loyal to itself."

Now, farmers, I could die in peace, believing that my work of the last twenty-five years, devoted, most of it gratuitously, in the effort to induce the farmers of this country to be loyal to this great interest, loyal to themselves; I could die in peace did I believe that I had contributed anything toward leading them on and upward to a position so essential to the welfare of this republic, and the stability of the government itself.

So now, what I beg and beseech, is for you to be loyal to yourselves, as well as to other people. Be loyal to your community and to this cause of your own. Defend it, place yourselves in a position where you can advocate it, where you can praise and honor it.

One other thing and I am done. If this country ever goes out in darkness, it will not be because the farmers through corruption have contributed to that result, but it may be through neglect. History repeats itself. Way back, Egypt ranked high in the scale of civilization. It is an open question today, whether America or any part of Europe has climbed as high in the arts and sciences as did Egypt at one time. Egypt was like America and fed the nations around about. "As rich as the banks of the Nile" was a by-word, and a deserved one. The best thought of Egypt was given to agriculture and the promotion of its interests, and as long as they did that Egypt went up; but by and by they began to oppress agriculture, it was driven to beggary and want, and today Egypt is distinguished for its poverty.

The same thing is true of Italy. While Rome took care of agriculture, she was master on land and mistress of the seas. By and by she began to oppress agriculture, the farmers became discouraged, and down went Italy to poverty and neglect.

Turkey is another illustration. Her chief occupation now is murdering Armenians.

England, with her colder soil—rich, because she has taken care of her agriculture.

America deserved more than all the rest of these, with her hardy population, high civilization, universal education, a magnificent future is before us if we will avail ourselves of it and climb every round of the ladder we can reach, holding fast to all that is good and honorable, increasing in ability, knowledge and power, and by and by our children will rise up and call us blessed, as I this night bless the fathers and mothers who have contributed so royally that their boys might receive something of an education that would enable them to stand as men in the world. I have concluded; the work is done in this respect, and I hope it has contributed something to the welfare of those who have attended day after day.

Good night to you all.

Mr. Garfield: Mr. Chairman, before we separate, after having listened to the complimentary resolution offered today, I want, on the part of the Kent County Institute Association, and for the people of Grand Rapids, to say that we feel very grateful for the large and representative audience from all parts of this State, and for the delightful exercises that have been given to us through this system of Institutes.

Gov. Luce: I am great on enthusiasm. I have always tried to get our folks enthusiastic; I am going to propose three cheers to close, for the Kent County Round Up Institute. I want them with a will.

(The wish of the Governor was gratified.)

The meeting was declared adjourned.

FARMERS' GIRLS.

[This essay was read by Mrs. Mary Sherwood Hinds of Stanton, at the Thursday evening session of the Round-Up.]

I am fully advised as to some of the business methods of some farmers in dealing with their sons. I am of course aware that the contract made in the spring by some farmer with his boys ranging from 10 to 15, was that the measly, lousy colt back of the barn is to be theirs if they keep it tailed up and alive until grass comes. Also that the tough brush patch of an acre at the southwest corner of the cornfield, which must be cleared out and broken up to square out the field, they are to plant with late potatoes and have half the crop, provided they do the job at odd times, when not crowded with the regular farm work. I am aware that the field of late potatoes sometimes only grows the father's half; that the poor colt, by careful nursing, wintered and grew up, and was finally broken very handy by the boys, and turned out at last to be dad's horse. I am also aware that it was these same boys who finally decided that they did not like the old home farm, and a little later started off to town for a job, or perhaps went west and grew up with the country.

This very emphatic assertion I am now prepared to make: That nineteen-twentieths of the men and women who have made this country of freedom great and themselves famous, came from the fields, not even being born in the town. That they were the output of the country free schools, while the bulk of them never saw the inside of an institution of higher education, except as visitors. They have been grown among environments which strengthened the muscles and expanded the nerve power, an atmosphere that developed their staying qualities. Their actual practical education was acquired from friction among men.

As a farmer's girl I had childish aims, hopes, ambitions, and aspirations, and I may not have quite gotten over my childishness yet, but in the race of life along the broad highway of human experience with my eyes open, it is by no means surprising that I should have learned a little. It is highly probable that the above fact is equally as true and bears with equal force on others as well as myself. Yet the fact that we were once children seems to be forgotten by many fathers and mothers. The farmers' girls are the coming wives and mothers and the homemakers of our country—one of the most sacred vocations ever given to humanity. The bars are down and the way open for the farmer girl to avail herself of any occupation to which she can turn her hand, and for which she is best fitted by taste, education or inclination. The advancement of the age and the business and political progress of our women are causes for congratulation. Practically, all legitimate occupations are now open to woman, which of course includes farmers' girls, and she avails herself of her privileges so fully that her doing so has ceased to be a matter of comment. Time was—and not past the remembrance of many of us—when the only work in which girls could engage was sewing and teaching. She could teach without loss of social caste, but the line was drawn just there. Today she can choose from a wide range of avocations, and although "society" may not recognize her, she has developed a noble independence of character, which makes her unmindful of the slights and snubs of those who live like the lilies. She finds pleasure and happiness in the absorbing interests of her work. We have women physicians, lawyers, ministers, editors, lecturers, almost beyond computation. There is hardly a newspaper in the country, but what has a woman connected with it in some way. We have also women horticulturists, women farmers and women stock breeders. All these are modest, quiet, unassuming, well bred women, whose occupation has in no way made them coarse in manner or mind. I might also mention a great many business women, illustrating farther how all occupations are open to women, even to the practical butcher. All this illustrates the ability of woman to fill any place in the world's economy. Surely the scope is wide enough, from the pulpit to the bar and shambles.

THE SUFFRAGE QUESTION.

A word on the suffrage question. There is no good reason why woman should not vote as well as the negro or the illiterate foreigners who seek our shores. Her qualifications are infinitely superior to theirs. All intelligent men acknowledge this, while most of them say that they are perfectly willing she should vote "if she wants to." That is right. I find more men who are willing to grant the privilege, than women who are desirous of availing themselves of the privilege. For myself, I have never nor will I ever question woman's intellectual and moral fitness to exercise this right, so dearly prized by the other sex that they hesitate to extend it to women and idiots; but I have and do question the expediency. What is to be gained? That is the question to be answered. The principal argument brought forward is that admitting women to the rights of the ballot will alleviate her conditions as a worker in the world and make her pay more just and adequate, give her new importance, and also permit her to share with men the fat offices under government. That the mere bestowal of the right to vote upon women would at all affect those great forces of supply and demand which govern the wages of the workers the world over, no one at all conversant with the principles of political economy can believe. That which governs wages is in no way related to the casting of the ballots.

The first step a girl should take toward a successful career, and it is a very important step, is to make up her mind what she wants to do. A strong purpose in life comes as near as anything can to insure success. The work into which you can put yourself and your best self is the work for you. Every trade or profession once mastered is a mere tool. Sagacity, knowledge, imagination—these may be real forces just as truly as muscular strength— but to accomplish anything they must be put to some real service. Self culture has been called a storage of power. But sometimes these intellectual gains are sought merely for the sake of personal satisfaction. There must be earnest work to accomplish anything important. There is compensation in the struggle by which character is strengthened, even at the cost of delay. It is never worth while to be too much discouraged by unavoidable circumstances, even when they seem the worst. A strong will and a clear head will get the better of them. The moment is sure to come when the way will be opened to a determined purpose. There are two quite different courses open to every young person who has a definite object in view, as a special aim that is to give direction to a successful cause. One presupposes what we call advantages, important help from others at the outset. The other course demands entire self reliance, and is generally accepted as a matter of necessity. For instance, one boy or girl is sent to college and supported by his or her father through the entire course, and the cost is quite a little fortune. Another begins at a very early age and pays his own way by hard work and close economy, and has to earn every inch of advantage for himself. I doubt if the chances, in this country at least, are in favor of the boy or girl who has the most done for them.

Supply your homes with good literature, get good books, not of the dime novel sort or even the sensational love story kind, but good substantial reading of the Farm Home Reading Circle kind, histories and biographies. Mothers, encourage your daughters by words of commendation. They cost nothing and surely should be given at every opportunity. Instead of words of reproach and fault finding, give them words of praise and encouragement.

Earlier in this paper, I have practically gone on record as intimating that women do not, of necessity, require to be vested with the elective franchise. I mean to say that she needs other rights more than the right to vote and hold political office. The wife needs better and clearer rights in farm and home, and the property of common accumulations. She must not continue to be, as she is now, a common creditor of the estate upon the death of her husband. A husband and wife at marriage form a partnership of which, so far as business is concerned, the wife is usually the silent member. Is she the silent partner in the skimping economy and arduous labors of getting what is called a start in the world? No. She takes up her share of the load and bears it through pain and travail, and has but a few days off from drudgery. As the mother of a grown up family and the wife of what is known as a successful man, it should not be made necessary for the probate court to administer upon the estate, if a dispensation of Divine Providence removes the husband and father. A wife ought to be acquainted with the run of her husband's business.

SHOULD STUDY POLITICAL ECONOMY.

Farmers' girls, and all other American girls, should carefully study questions of political economy and the science of government. Next to physical health, the mothers of this country should have sound and patriotic political health. Mothers and daughters, inform yourselves on questions that are the leading ones before the country, and when you meet, air your ideas, be on the alert, grasp all you can though you are a farmer's daughter or a tradesman's wife.

I do not wish to seem to be ignoring the culinary art, for eating is a necessity of our being, and I really cannot see how the human race could exist unless some one paid attention to that important part of work. Cooking may justly be considered an art.

HOW DISSIPATION COMES.

A mistake many of our girls make is to devote too much of their time to novel reading. The reading of an occasional novel of pure and healthful tone may be not only an innocent diversion, but a good mental stimulant. But the reading of the lighter sort of novels, which, while not teaching bad morality, do represent life in a morbid and unreal light, awaken cravings that can never be satisfied. It is a mental dissipation of a very dangerous sort if carried to excess. This intemperate craving for sensational fiction weakens the mental grasp, destroys the love of good reading, and takes away all relish for the realities of life, making one who is addicted to it a weak, frivolous, petulant, miserable being.

Finally, my dear girls, I do desire to emphasize this: Consecrate your lives to some good purpose. God has some purpose concerning you, some good work for each of you to do, and he wishes you to devote the power which he gave you when he created you to that service. What kind of work He has for you, I cannot tell. But I know he is calling every one of you to some enobling work. The joy of life must be not in being ministered unto, but in ministering. God help you, girls, to understand it before it is too late. There is so much good in living, if one knows how to live. There is a bright and better way expressed fully in the well known motto: "Look up, not down; look forward, not backward; look out, not in; and lend a hand." Set your feet in that path, and follow it patiently and you will find it the path that shineth more and more unto the perfect day.

WOMAN'S SECTION.

MRS. MARY A. MAYO, CONDUCTOR.

WEDNESDAY AFTERNOON.

KITCHEN ECONOMY.

MISS MARGARET M. SILL, DETROIT.

Good cooking consists in the first place in exciting the digestive organs. The more we excite them and give them pleasure, the more thoroughly is our food digested. If we take into our mouths food that is poorly cooked, the saliva will not be excited; no pleasing taste is found, and the food passes to the stomach without having had the work done for it in the stomach that ought to have been done, hence more is demanded of the stomach, sometimes so much that it is not able to perform it and the person is made ill. This is indigestion, the foundation of many disorders.

It is a common saying that the mother is the teacher of cooking. Many mothers are not competent teachers, because they do not know themselves, not having been taught. Many of the discomforts of home, ill health, ill temper, and their attendant evils, come from the fact that the woman of the house has not been properly taught either as a cook, manager of her home, or her duties as wife and mother.

There is a movement, which is growing in favor, to introduce into our public schools domestic economy. It is an excellent thing to have some knowledge of domestic economy. I think I am safe in saying, that in the average household, one-third of the food is wasted from lack of knowledge as to cooking, managing, and saving.

The question was asked, "What can five persons live healthily upon per week?" And when I replied, "five dollars," they were dismayed. I had charge of a house last summer where they averaged twenty persons a day. The cost of living for each person per week was one dollar and thirty-five cents. For breakfast, we had oatmeal, eggs, meat, potatoes, hot rolls or muffins. For dinner, soup, meat, two kinds of vegetables, potatoes, and dessert. There is no economy in buying cheap meats. Do not have the bones taken from beef or mutton; have them cracked, as they will make the best kind of soup. The American people do not eat enough soup. All food before it can be assimilated must be converted into liquid. If you will eat good soup, half the work of digestion is saved. What is good soup? Water that has taken into mixture with it all the nutritive properties of beef or vegetables, or of whatever it is made.

If domestic economy was taught in our public schools it would solve many of the problems of the "poor question." The possibilities of the woman in the home, her influence upon the inmates in cooking, managing, saving and training cannot be estimated.

In selecting beef, choose that which is bright red, and which when pressed with the finger leaves no dent. The best pieces for beef tea come from the neck. The best piece for soup is the hind shank. In the shank you get marrow, lean meat, the particles that make bone and muscular tissue. The first cut of the ribs is the best for roast. The tenderloin steak is good, so is the porterhouse. While the round steak is tougher, it contains more nutriment. If mutton and lamb have a disagreeable woolly taste, remove the thin transparent fibre that covers them. The rule for cooking beef, mutton, and lamb, is to cook twelve or fifteen minutes for each pound.

To remove fat from the top of broth or soup, lay a piece of common brown paper on it, remove as soon as it has absorbed all it will hold, then lay on another until all is removed.

To make chicken soup, cut into small pieces, add cold water, cover tight, simmer from four to six hours, strain and add a little rice previously boiled, add a little cream and salt to taste.

Deep fat frying is much more satisfactory, as well as economical, than frying in a frying pan. Fish balls, doughnuts, croquettes, anything you wish may be fried in the same fat.

If the fat turns dark after repeated use, clarify it with pieces of potato. The best way of cooking steak is to broil it. This cannot be well done over wood coals. A shovelful of charcoal gives a good broiling fire. The next best way is to heat your frying pan very hot, lay in the steak, sere it, turn quickly, and sere the other side.

To make oyster soup, boil your milk in a double boiler, season with butter, pepper and salt; drain your oysters, add them to the milk, and boil until the edges curl.

Good mashed potatoes must be boiled in water that breaks in bubbles at the top. Boil until soft, drain, then remove the cover and lay over the top a clean dry cloth, mash, season with salt, pepper and hot milk. Beat them light with a fork.

To make coffee, buy the best, have it ground fine. To one-half cup of coffee, add one-half an egg, stir thoroughly together, scald the pot, add the coffee, and pour over it one quart of boiling water; let it boil five minutes.

DISCUSSION.

Mrs. Mayo: The question comes to me, "Why are not our daughters skilled in this line of work? If they live they will have to do it, and how few can bring any skill or competent training to their aid. They are educated for everything else except what God designed them to be; wives, mothers and home makers. It is the unskilled housekeeper that is wasteful; she does her work at a disadvantage, finds every task a burden, is a hard mistress to serve, and seldom has competent servants. Science is doing much today in aiding the chemists of the kitchen, but so few care to avail themselves of the help, but keep on in the ruts. Women are slower to move in new ways than men.

The time has come when domestic economy, in all its branches, must be taught somewhere. The parents and daughters demand it, and the welfare of the homes demands it. We are soon to learn about "Art in the Rural Home." This is of great importance to us as farming folk. It has too long been neglected. The country homes need all that art, education and our means will permit to make them beautiful, refining and elevating. All the appointments of our homes should be as pretty and attractive as we can make them. This does not call for a great outlay of money—a little money, with a cultivated, artistic mind, will make such a beautiful harmony in the arrangements of a home as to charm all who come beneath its roof.

A table, daintily spread with the whitest linen, pretty dishes and a few flowers, will materially aid digestion, besides exerting a refining influence upon all who sit at the board. We do not give attention enough to artistically adorning our homes.

Q: "Miss Sill; how do you make good pie crust?"

Miss Sill: The secret of a good pie crust is quickness in making, cold materials and a hot oven; use twice as much flower as shortening, and water sufficient to moisten; put flour in chopping bowl, add shortening and chop it with a knife.

Q: "Do you use cottolene, lard or butter?"

Miss Sill: I prefer butter.

CHEMISTRY OF THE KITCHEN.

PROF. FRANK S. KEDZIE, AGRICULTURAL COLLEGE.

The practical applications of scientific principles have, for some cause or other, kept themselves out of the kitchen. Whether this was brought about by the supposed incompatibility of the feminine mind and scientific study is doubtful. My own idea is that so long as the masculine side of the house was satisfied with the results produced in that domestic chemical laboratory called the kitchen, the presiding genius, the cook herself, didn't care for principles, but confined herself to the practice of the art of cookery, without bothering her head about any studies on fermentation relating to bread making, nor to bacteria themselves, as long as they were not big enough to be seen and remarked on—to her disadvantage.

Of the materials used in cooking, the yeast is perhaps one of the most perplexing. In this little bit of compressed yeast I now hold up before you we have a growing plant. This plant differs very much in its action and aims (if it has any) from the plants grown for the production of our staple crops, wheat and corn. The wheat crop is the perfected seed produced by the wheat plant. The crisp, sweet loaf of bread is not the perfected seed of the yeast plant. I use this comparison to direct your attention to the fact that the yeast plant is planted in the sponge, not to produce the fruit of this peculiar little plant, but, as we may express it, to change the character of the soil in which the yeast plant grows. As we all know, the prime object of setting the sponge with yeast is to produce lightness in the bread. The sponge is light, when the yeast plant, by its lively growth in the flour and other materials used in setting the sponge, has formed from these materials alcohol and a gas,—carbon dioxide.

Nowadays, how careful is the wideawake farmer in selecting his seed for planting, and how careful is he to cultivate thoroughly to destroy the weeds. But do we ever regard this yeast as a plant, and do we ever ask is it pure and true to name—are there any weed seeds in it?

These queries which are naturally suggested when we are contemplating a bag of seed wheat, have equal force when we consider a cake of compressed yeast. The microscope has done much to help clear up the yeast question. Briefly mentioned, the facts regarding yeast are these: First, starting with a yeast plant which is strong and healthy, if grown in the same medium (i. e., on the same soil) indefinitely, it soon becomes weak and runs out. Second, the temperature at which it thrives best is from 68 to 70 degrees. Third, wherever we find compressed yeast it always contains some weed seeds (bacteria). Fourth, these bacteria thrive best at a high temperature, 75 and 80 degrees—(they produce lactic acid from the materials in our sponge). Fifth, if the compressed yeast is old and has been exposed to the air, the bacteria will be strong, the yeast weak. The weeds will grow faster there than the yeast, and instead of having alcohol and carbon dioxide produced in our bread pan, lactic acid is made and the bread is sour, and somebody else makes acid remarks.

(In reply to question.)

No; the alcohol produced by growth of the yeast plant doesn't remain in the loaf—it is dissipated in the oven. Sometime in the future we may see placed upon the market perfectly pure yeast, put up in such a manner that the bacteria of lactic fermentation cannot get at it. When that day comes, making sour bread will be nearer a lost art than it is at present.

Bacteria are quite the stylish subject of conversation nowadays, and well they may be when we are working in kitchen science, for the results of these indefatigable little workmen—in spoiled can fruit which you have taken such trouble and care to prepare during the hot days of June and July for the winter's supply. Canning time in summer, what a trial that is on the farm. To make your work easier, June grass and timothy are ripe about the time that cherries, strawberries, raspberries should receive your attention, the weather is hot, the help in the kitchen is called home or has a felon just as the extra hands for haying appear, and the fruit must be put up. How welcome would be then some process by which the fruit could be canned without the use of long stewing, putting the cans in hot water, etc., to kill off and discourage the bacteria which else would spoil the fruit. There are several processes which do accomplish the preservation of fruit without use of heat, but so far as I have investigated them I cannot recommend them as being safe to use, and for this reason they all involve the use, as a preservative, of salicylic acid or salicylates. (Salicylic acid, antifermentin, extract of salyx and American Woman's Standard Canning Process were then compared by appropriate tests.) The objection to salicylic acid as a preservative is this: since it prevents the decomposition induced by bacteria, its presence in food materials must also in like manner prevent the decomposition of food material, which we term digestion. This is what we might logically expect, and is what has found to be the truth in many cases which have come to my knowledge. As an example of the power of this substance as a preservative, I may call to your notice the bottle of tomato catsup which stands on our hotel tables day after day, and week after week, without spoiling, although open freely to the air; while catsup made in the farmer's kitchen would spoil in a week's time, or less, exposed to such conditions. Of the hotel sample made by the large manufacturers of these goods, an analysis will show the presence of about .15 of one per cent of salicylic acid—not much, to be sure, but enough to account for the great difference in keeping qualities between domestic and factory made catsup. The use of this substance as a preservative for fruit should not be indulged in, however great the desire, which we all have in common, to help the housewife and lighten her burden at this most trying season.

(Methods for testing with baking powder, together with a formula for a home-made baking powder were then shown and explained.)

I cannot close this rather rambling discourse without calling your attention to a very useful disinfectant and deodorizer, which you will find to be easily prepared, and which, aside from its germicidal power, is also an excellent material to clean sinks and drains. Take a common stoneware crock holding about three gallons, fill nearly full with water, and dissolve in this three or four pounds of sal-soda crystals. To this solution add a pound or two of chloride of lime, stir thoroughly together. A clear solution, with a white sediment at the bottom of the crock, will be the result after a few hours. Use the clear solution freely in your sinks, drains and slop jars, and you will be convinced that it is worth the trouble to prepare.

THURSDAY AFTERNOON.

MAKING HOUSEWORK EASIER.

MRS. MARY A. MAYO, BATTLE CREEK.

In order to make the housework easier, it is very essential that we have a love for it, and a desire to do it in the best manner possible, and enjoy the labor necessary to its accomplishment. I pity the woman who hates her housework. She may have a most convenient house; all the labor saving appliances she desires, but if she hates it, it is going to be hard for her and hard for her family. That which we love and enjoy doing is easy of accomplishment.

How many of us are loving our housework because it is our work, and our duty to do it; loving it because we enjoy doing it, and all for the sake of the loved ones that share with us the shelter and comfort of the home? When done in a spirit of love, and in the fulfillment of the solemn obligations of wife and mother, the tasks are pleasant, the burdens easy, and the work glorified. If we love it, it will be easy. Nothing that we have to do is menial. The cooking, dishwashing, scrubbing, washing and ironing all may be made beautiful, uplifting, Godly work, if we but engage in it in the right spirit.

Systematizing our work goes a long way in making it easier. Not the system of a machine, but such an order in doing that a sharp, shrewd, business woman will bring to bear upon her work. This housework is our business, and we must use close calculation, economy of material, time, and strength. The larger the family and the smaller the purse, the greater the need of a systematic business management. We are committing a wrong against our children when we fail to have order in the home, and a system in our work. They will soon go into other homes, bearing with them the atmosphere in which they have lived, benefiting or degrading as the case may be.

Well matured plans for each day will make work easier. A prayer for grace and strength to meet the day is very helpful. Make an invoice each morning of the demands of the day, plan how to do it easily and well with the least outlay of time and strength. Carefully calculate on how much you can cancel out without discomfort to yourself and family. Then bravely set hand and face to the work of the day. Nothing is gained from half doing our work, or in doing two or three days' work in one.

The washing should be done on Monday—if the Sabbath has been a day of rest, you are rested and ready for the washing. The linen for the family and house has been changed and is ready for washing. Each member of the family should place their soiled garments in the basket or bag for soiled linen—much time and strength is thus saved to the washer. Each member of the family should bear their just share of the burdens of the work. If there are children, let the work be so divided as to give to each, where it is possible, that which they like to do best. Let the occupants of each bedroom put their beds to air; teach your boys how to do this properly, a small task for each, but great help to the person who makes the beds.

When possible, iron on Tuesday—clothes iron much easier where they can be taken direct from the line to the ironing board. If necessary to sprinkle, *do it well* ; clothes well sprinkled and carefully folded are half ironed. Here is a good place to work cancellation—strike out kitchen towels, tea towels, coarse under garments, overalls, coarse sheets and all rags; cancel again all fine shirts, collars and cuffs, and take them to the laundry.

To make cleaning potatoes easier, clean a bushel at a time. Put a bushel in a tub with just water enough to cover them, scrub them with a scrubbing brush, put them in a clean bushel basket and rinse them thoroughly by pumping or pouring over them a couple of pails of water. A good time to do this is after you have finished washing.

Set your house in order every night before going to bed. It takes but a few minutes to set back chairs, shake up cushions, arrange the papers, magazines and books in their proper places, straighten the lounges, and hang up whatever has been left about.

Brothers, are you doing your best to make the housework easier for that dear, brave wife of yours? Are you careful to put your own garments where you know they belong? Are you showing your faithful wife that you appreciate her unremitting service for yourself and your family, giving her helpful, tender words of endearment and encouragement? Women live upon this and starve without it.

Sisters, are you aiding these husbands by kind words of cheer, tender, sympathetic counsel, or are you discouraging, fault finding and fretful?

If anyone deserves a well spread table, it is the farmer's family; linen white and nicely laundered; dishes as pretty as we can afford, daintily arranged and well supplied with plenty of well cooked body and brain sustaining food. A white cloth with little children? Yes. You can teach them, if you begin in time and begin right, to keep their hands out of the food, and not to climb all over the table. Place a piece of white oil cloth at their places, also where the man sits whose sleeves are necessarily soiled. If you have a piece or two of silver, and silver knives and forks, take them out of their wrappings and use them. The refining influences of a daintily spread table upon the members of your family cannot be estimated.

To make all easier, do not *worry* or *fret*. Some one asks, "How can it be helped when you are tired and things go wrong?" When you feel every nerve beginning to quiver, and this feeling asserting itself, hold right on to yourself, shut your lips, lift a fervent prayer to the dear Father who knows all about the quivering nerves, the tired body, and tried spirit; ask Him for help and it will be given.

It takes a great deal of grace and brave hearts to meet all the demands that are made upon us. Some one has said it takes ten generations to make one man. What kind of a truth are you giving to generations yet unborn? Let us be faithful to self, work and God. May every year crown you with joy and gladness; may your resurrection morn be radiant with the reward that has been promised by Him who said, "Unto every man according as his work has been."

Q: "Mrs. Mayo, do not the farmers' wives do too much cooking?"

Mrs. Mayo: Yes; especially in cooking fruit. When we have such an abundance as Michigan gives us, do not spoil it by cooking, but put it on the table fresh and ripe. The city woman does this, while we toil and broil to cook it.

DISCUSSION.

LED BY MRS. H. GAYLORD HOLT, CASCADE.

First in the line of making housework easier, I should place order, for there should be order in housework, as well as in other kinds of business. I say business, because there is as much business in good housekeeping as in any other pursuit. "Order is heaven's first law." We will do well to follow the advice of our grandmothers, and "have a place for everything and keep everything in its place," and thus save unnumbered steps.

Promptness is a very material aid to the housekeeper. Get the meals regularly, and try and educate the men of the house to eat at the appointed time. Begin the work of the day early in the morning, thus forestalling unexpected delays or hindrances. Another old saying, "An hour in the morning is worth two at night," is, in this case, eminently true.

System. More depends upon being systematic, perhaps, than upon any other one thing. Planning the work ahead, and doing certain things on certain days, or at stated times of the month or year, will lighten the work, and save much confusion. A wise housekeeper, like an able general, will plan her campaigns, and will be prepared, if possible, to withstand the attacks of the enemies of good housekeeping, which are sure to attack the unguarded points of the home.

There should be a division of labor among the different members of the household. If there are children or young people, some definite duties should be assigned to each, that they may learn to share the labors and responsibilities devolving upon the mother. They will thus become better fitted themselves to fill the position of wife or mother, or the head of the household, as the case may be. It is a great mistake to allow girls to grow up with no practical knowledge of what constitutes good housekeeping. Housework is anything but easy for them, when it suddenly devolves upon them, with no previous education in that line. To make housework easy, one needs to be educated for that, as well as for other things. No matter how much a young woman knows about books or music, or painting, her education has been sadly neglected in one line at least, if she has not learned something about how to keep a home, as good housekeeping is essential to the health and happiness of a family.

In a recent number of a household journal, a housewife states that she always devotes Monday to the picking up, brushing and putting away of the clothing worn on Sunday by her husband and children. Wouldn't it be just as well if some of the Mondays were spent in teaching those children to attend to their own clothing? We won't say anything about the husband, perhaps he is too old to learn. Evidently his mother did not bring him up right. Many a wife has to suffer for the foolish indulgence of her husband in his youthful days by his mother. Mothers owe it to their boys as well as to their girls, to teach them to be helpful, and to take care of their own possessions, instead of throwing off that care upon sister or wife.

Finally, the best of all books tells us that a good housewife "looketh well to the ways of her household, and eateth not the bread of idleness. Her children arise up and call her blessed; her husband also, and he praiseth her."

SAVING STEPS.

MARTHA T. ADAMS, GRAND RAPIDS.

The poet has said, "To die is to begin to live. It is to end an old, stale, weary work, and to commence a newer and a better." If by a little thought and foresight, we can devise some way to save steps, and thereby end old, stale, weary work, and commence a newer and a better, our labor will not have been in vain. Right habits should be formed early in life, and soon become second nature. Habits of early childhood cling to us. Even a baby may be taught that there are others in the world who have rights and are entitled to privileges, which they must respect. The pernicious practice of walking with a baby to get it to sleep makes weary steps for some one. Rocking a baby is tiresome to the rocker and harmful to the baby. When he is old enough to run around, if he is hungry, have him sit down till he is through eating, then, if crumbs are made, it will be but little work to brush them up. If he is given food when he is not hungry, and allowed to run around, the crumbs are scattered over the floor and many steps are taken, to give the room the tidy appearance that was destroyed by the negligence of the thoughtless mother, who is unconsciously teaching her child disorderly habits, as well as to be inconsiderate of others.

Some mothers give their children scissors and paper to cut; it makes steps for some one, and an exercise of other parts of the body than the feet, to get it off from the floor. If it is fun for the children to cut it, have them think it is more to pick it up, thereby saving your steps and developing their muscles. Let a child amuse itself, get its own playthings and put them away, and never allow them to leave them for some one else to put away.

Save work by economizing in the weekly washing; plenty of clean clothing is essential to health, and there should be a needful supply, but discard tucks, ruffles, and elaborately trimmed undergarments, have them serviceable and plainly made, and use the time saved in ironing for rest and recreation.

Inconveniently arranged homes cause many extra steps. As a rule, a small kitchen, where the work can be compressed, where only ten steps are required instead of twenty to do the same work, will prove less fatiguing. Have a store room, if possible, opening from the kitchen; have the stove a convenient distance from the cistern pump, so that with a tin pipe (having a funnel at one end to pump into), the boiler or reservoir can be filled without a step being taken. Place the wash bench so the tubs can be filled the same way. Have well water piped to the kitchen. Have a woodbox in the woodhouse, with a door opening into the kitchen (two by two and one-half or three feet is a more convenient size for the door than a smaller one). Never have a step to go up or down between rooms. Have the dish cupboard open from both the dining-room and kitchen. In going from one room to another, if there is anything to carry, take it with you and save steps.

Worry tires more than work. "Fret not thyself," says the Psalmist, and another has said that "To a fretter everything goes wrong. The whole mechanism of society is thrown out of gear; and, instead of moving smoothly, as when lubricated by the oil of kindness and charity, its cogs clash, and its pivots all grate harshly." The spirit in which our work is done, lightens our labor or adds to its burdens. Use common sense with your labor. There is no saving in steps or time, in slighting work that ought to be done well; if we do our work temporarily, we will always have temporary work to do, at a loss of both time and steps. There are some things that can and ought to be slighted, and happy is she who finds what they are. Ruskin says, "There are many little things which to do admirably is to waste both time and cost; and the real question is not whether we have not done a thing given as well as possible, but whether we have turned a given quantity of labor to the best account."

The home is a little universe, and to keep its sun, moon, and stars all moving in harmony, requires wisdom and foresight. There is no place, or profession, that needs a wider range of knowledge, to be successful, than in our calling; much may be learned from skillful teachers, but some have a knack to turn off work, that others are never able to acquire. If we would profit by the experience of others who have lived before us, and those who are to follow us would profit by the experience we leave to them, all would be benefited; but, alas, for the perversity of human nature!

Economy is commendable, and a judicious housewife should be prudent, but prudence does not always consist in saving a few pennies, at the expense of health, and paying, to a doctor, dollars for the pennies saved. The law of compensation holds good in the household as well as in all other places. If one borrows strength from over-taxed nerves, it must be paid back with usury, for they are a Shylock who will demand the pound of flesh, and if the drafts are many and frequent, and the strain too great, the vital cord will break. It is a sad thought that "We'll all be forgotten a hundred years hence." "Who could choose, without a struggle, to be swept away from all remembrance, and have part no more with living men?" and yet, what does it matter, if we have done our part while here, to help build up character, and raise the standard of excellence to the point God designed. Every step in the right direction leads us one round higher in the ladder of life. Good actions and noble deeds should go with us, step by step, to the end of life's journey, that when our pilgrimage is ended we may hear the welcome words, "Well done."

ART IN THE RURAL HOME.

PROF. W. S. HOLDSWORTH, AGRICULTURAL COLLEGE.

The best things of life are the outgrowth of a good home. The house, the center of the home, should be as nearly as possible ideal.

No matter how humble, the home may be made attractive and homelike. Though for temporary occupancy only, make the rooms pretty and cosy. This need not entail much extra expense, just the exercise of a little care and taste.

Some of the things to be taken into consideration are the color and covering of the walls and ceilings, the woodwork, the floors, the color and material of the draperies, and lastly the pictures.

Generally, the color scheme for walls and ceilings should be light. The effect is more likely to be bright and cheery.

Suggestions for the decoration of a small home:

The hall, the first place into which a visitor steps, should make a good impression, so it ought to receive special care. It is much used, therefore plan it so that the wear and tear will have the minimum effect. Use a paper with a dado and having a fairly distinct pattern.

In the parlor and sitting-room, the prevailing effect should be one of airiness, light, pleasing colors, something in itself, aside from pictures and furnishings, to create interest and a feeling of ease.

Plain paper makes the best background for pictures, and should have a ceiling and frieze of an attractive pattern.

If the paper is figured, avoid loud, gaudy patterns.

In the dining-room, warmer colors will be in keeping with something more of an attempt at richness of effect.

In the chambers, avoid dark colors and heavy, depressing effects. Have the impression soothing and restful. Do not use busy, intricate patterns. In colors, light shades or tints of blue, soft grays, delicate pinks and rosy colors. Look out for arsenical greens, and eschew full, strong colors, especially red.

In the woodwork, do not use elaborate mouldings and numerous beads. They catch too much dust. More harmonious effects are likely to be obtained at less cost if the woodwork is painted rather than finished in natural wood. In hall and stairway and dining-room, the latter comes in nicely.

The ideal floor is one done in natural finish, or painted or stained to harmonize with woodwork. Then a few good rugs, which may be easily removed and cleaned.

Thick, heavy hangings at doors or windows—voluminous draperies catch the dust—are objectionable.

Try to get fast colors, so as to be not afraid to have plenty of air and sunshine.

In pictures there are certain things to be avoided.

There is the abominable factory made oil painting, the average chromo found in the stores, and the family portrait, secured through the aid of some agent or enterprising local dealer in boots and shoes. One must consider the subject of a picture as well as the medium in which it is done, and the quality of its execution. Things that are well enough to see occasionally in a book or portfolio would not do to hang up on the wall as constant companions.

Good etchings are somewhat expensive, and are out of the question for most of us.

One can often get good half tone engravings or wood engravings from the magazines, which would look well framed in broad mats and narrow mouldings. Good photogravures of famous paintings may often be obtained at low rates.

One of the best ways to receive safe guidance in matters of art, and at the same time get pictures in color, many of which are fine examples of close imitations of oil and water color paintings, is to subscribe for some leading art magazine, such as the Art Amateur or Art Interchange. These contain articles on current art topics, drawing, painting, china decorating, household decoration and furnishing, good engravings, drawings of home interiors, etc., and each addition is accompanied by two or more fine studies in color. A number of ladies in a neighborhood might club together and take one of these, read the magazine and divide the color studies. Frequently directions are given for framing the pictures. One is not likely to go far astray in following the guidance of these standard magazines, and the pictorial matter so obtained is frequently first rate.

DISCUSSION.

MRS. SARAH SMITH, GRAND RAPIDS.

Although the professor has told us a great many nice things about paintings, hanging them, draperies, and many other things that are fine; yet I think that he has left out two very important objects about a home. They are the flowers and the children. What can be more beautiful than plants in the window and about the yard? For our home is not confined to within the walls of the house.

The flowers have a refining influence on all that come in contact with them and are attractive. I knew of a shanty with flowers in and all about it, and across the street there stood a fine home without flowers or shrubbery. The dwellers there complained that no passerby looked their way, they all looked at the humble shanty with the flowers all about it.

As "Art is the employment of means to accomplish some desired end, the application of knowledge or power to practical purposes," in what capacity then can art be brought to better use than in the training of children in the rural home? For, with all its beautiful embellishments, nothing can compare with the living pictures of health, happiness and intelligence of the impulsive children, ready to be trained for good or evil, so easily turned this way or that, with the kind influence and constant teachings of the mother.

Great men often have weak children, great women seldom have; but it is in the direction of moral training and the development of character that the mother is most powerfully felt. What a faithful suggestion lies hidden in that brief line of Holy Writ: "His mother made him a little coat." The coat that Hannah made for Samuel, who, from serving in the temple, became the prophet and the upright ruler. The little coat has a figurative application to every mother's high calling. For she not only provides for the body, but for the moral "habits" of character and conduct. The mother, more than anyone else, helps to weave her child's "habits" of thought and conduct, and does it as clothes are made, stitch by stitch, little by little, and by silent influences. Hannah's daily life helped to weave Samuel's noble character. The mother made the man. Train them so that, with Henry Clay, they will say, "I would rather be right than be president." Then, as Bishop Simpson said, they can say, "The voices that spoke to me when a child are now speaking through me to the world." In this way you have a picture that will never fade, its influence will live on and on, and as Lowell says:

"An angel stood and met my gaze
 Through the low doorway of my tent.
The tent is struck, the vision stays;
 I only know she came and went."

FRIDAY AFTERNOON.

MOTHER AND DAUGHTER.

MRS. MARY A. MAYO.

We want to talk this afternoon as a mother to mothers, as a daughter to daughters. Mothers, what are you teaching your daughters in regard to themselves? how are you teaching and for what purpose? These are serious questions and demand from us careful thoughts and truthful answers. Are you teaching them, in a good mother's sweet way, what God designed them for, and how? or are they growing up in ignorance of the laws that control their being? And not only that, but which control the lives of the children that shall be born unto them.

Is that bond of confidence, which between you and your little daughter is perfect, being weakened as she grows older, until arriving at womanhood's years (when she needs it the most) it is broken altogether? When this bond of confidence is broken, the *mother* is the one who generally breaks it. And so subtle and delicate is that tie of confidence that when once broken it is never so strong and perfect again. The average mother does not purposely sunder this bond of confidence, but from the pressure of work, carelessness, of indifference, and frequently by a spirit of mock modesty, she fails to impart to the boy or girl the very knowledge that concerns them most. The children come to us and ask us strange questions, questions that are forcing themselves upon the mind of every growing child. In reply to these momentous questions, sometimes we smile and put them off with evasive answers; sometimes we say, "wait until you are older," or bid them cease asking such questions; while frequently we deliberately tell them what is not true. Why, in the name of reason and in justice to the child, can they not have a wise, tender, truthful answer?

More girls go to ruin for the lack of proper knowledge of themselves and the laws that control them (which their mothers should lovingly and truthfully communicate) than from any other cause.

Mothers, something is wrong. I have had bright, sweet faced girls come to me in confidence and ask me such questions as these: "What am I? What did God design me for? Why, and how am I different to my brother?" I always tell them that they must ask their mothers of these sacred things. "I dare not even speak to my mother about these things, and I do not believe she would tell me if I did." How I pity such a girl.

Voice: "What do you do?

Mrs. Mayo: Do? Clasp her just as close to my heart as I can, and tell her all I know about the strange, wonderful, mysterious body God has given her; tell her she is a woman and the beautiful possibilities of her life; tell her how to care for her wonderful body, how to keep it pure, sweet and strong, ready for the Master's use.

Mothers, if your daughter does not come to you and talk these important matters over with you, your child is on dangerous ground and you have placed her there. This is strong language, but I believe it.

These questions are forcing themselves upon your children, and if you do not answer them, some one else will. And the chances are that they may receive their knowledge from impure sources, and in an improper manner. An awful responsibility rests upon us as mothers. Let us not dare to put it aside, scoff at it or shun it altogether.

I know a bright boy ten years old. He came home from school one night all excitement. "Mother, I want to tell you something; I must tell you." The mother took her boy into her lap, and there this little lad told her vile, wicked things that some vicious boys had taught him at school. The mother was almost overwhelmed. Two thoughts were pressed upon her. While I have been sleeping the enemy has come in and sown tares, and how shall I root them out and save my boy. Fervently that mother prayed, and clasping close her boy she told him those were black, vile thoughts and he must try and put them out of his mind, never to think of them again. Then she told him about himself, that God had made him to be a man, how anxious she was that he should be a clean, pure, strong man. The boy did not comprehend the mother, so she made it plainer and plainer until the boy did understand, when he threw his arms around her neck, laid his cheek to hers, and in such an earnest tone said, "Mother, mother, why did you not tell me this before?" What a reproof!

Why is it that children are so frequently born a bundle of nerves, peevishness, fretfulness and misery? Because the mothers so often are ignorant of the laws that govern themselves and their unborn child. Dr. Norris here will tell you this is true, and that mothers, pregnant with their first children, almost go demented from lack of knowledge. The greatest want of this nation today is pure, clean, strong men and women, and we must rear them.

In the general assembly I heard them talking about "breeding high grades, pure stock; set up an ideal and breed to it." In the selection of fruit trees, "Get the best; it does not pay to raise anything else."

How many parents have an ideal in their minds when rearing their children, and give to each child the greatest care, thought and consideration from its conception until it is the fully developed man or woman?

Every child is entitled to a good birth, a royal welcome, the best training and wisest care its parents can give; God pity the child who does not receive this.

Mothers, are you using the greatest care in selecting your children's associates? Keep your little children at home nights, and have other mothers keep their's at home. As they are growing up, are you still careful of their companions; are you making them strong morally, to meet the evil that will come, so that they can stand strong and clean, and be a help to those who need it?

I am glad to see so many girls here this afternoon. I like to talk to them—to help them and strengthen them. I know you are brave; love makes us all brave. Some girls think they can "keep company" with a young man who chews, smokes, swears, drinks, and by that wonderful power of love reform him. He tells you you can. My dear girls, you may, but the chances are largely against you that you will not. Ninety-nine times out of a hundred, the kind of a man you marry is the man you will live with; can you afford to take the chances?

Mothers, are you teaching these daughters the meaning of marriage, true marriage? It means thinking together, working together, praying together, *living* together for a high and holy purpose.

Give your daughters the best possible chance. Teach them that they are children of a King; let them bear upon heart and face His image. Teach your sons what is wrong in their sister is just as wrong for them, no matter who they may be. Teach them if they debase themselves and their manhood, they are destroying the very functions of their being. God never meant a woman for womanhood any more than He meant a father for fatherhood.

Mrs. Laura Haviland: The responsibilities of young women are great. Call for pure young men to be your associates. Discourage evil in young men; your influence is beyond conception. The time is coming when purity in young men will be demanded as well as in young women. Humanity is groaning to be uplifted, and you young women must come up to the help of the Lord against the mighty.

Mrs. Davis: O, mothers, mothers, I must say something to you today. I am an old lady, and I speak what I know. There comes a time in your daughter's life, and it seems to come so soon, when somebody, some young man, sees that you have a daughter, bright of eye, fair of face, and such delightful company. They come to call, and they call again and again, and pretty soon they are known as their "beaus." Now, when this happens, as it will, then is when your daughter needs your confidence and your help.

I have known girls who tried to tell their mothers what these young men said to them, and their mothers would not listen. They said, "Go away with your foolishness; I don't want to hear it." *and they went away*, and they listened more and more, and some they ought not to have heard. Do you think they could or would go to their mothers and tell them again? No, they would not.

I remember so well when I was a girl that I told my girl friend "that I just went and told my mother what some young man had said to me." She says, "Do you tell your mother everything your beau says to you?" I said, "Yes, I did." She said, "I would give the world if I could tell my mother, but she will not listen; she sends me off, and I feel so bad; I want mother to know, I think she ought to know, but if she will not listen how can I tell her?"

I think these young men would be quite careful what they said if they knew our girls would come and tell us; if they knew there was perfect confidence between us, and that they were guided by their parent's counsel.

It is these girls that don't tell their mothers, either because their mothers will not hear, or because they are so smart they think there is no need to tell them, they know as much or more than they do, that have hard times, see sorrow and trouble.

A MOTHER'S VIEW.

MRS. A. O. SMITH, GRAND RAPIDS.

I believe you all agree with me that the ideal relationship between mother and daughter should begin before the conception of the child. We talk glibly about the holiness of motherhood, but if we read the daily news, we know that is a thought that has never reached a large proportion of mothers.

A little soul should never be summoned into this world to sin and suffer, and perhaps enjoy, unless the father and mother have duly appreciated their responsibilities. Here is where ideal motherhood begins. Let us not fear to tell our daughters what many have learned through bitter experiences, that holy motherhood means responsible motherhood. We summon a little life into this oftentimes hard world; shall we not begin with the very first independent breath our baby draws to fit the little one for the struggle?

There are many, mothers only in name. To give birth to a child is the smallest part of motherhood; it is only when the spiritual motherhood has been developed in us, that true motherliness begins. When we feel ourselves and our little ones as necessarily parts of the great throbbing, pulsing life of the world, then only will we feel the importance of the relationship of mother and child. What the mother will, she can make of the tender, impressionable life intrusted to her. She will study that she may make herself the guide, and inspire toward all that is best. She will not care for a career apart from her child, but only for great things, that they may help on the development of the life so near her own.

All the wisdom, all the accomplishments in the world, will not be too much for one ideal mother to possess, and she will learn that true secret of motherhood, to live "with" not "for" her children, to enter into their lives and try to see with their eyes, and feel what they feel, always striving to help on toward complete rounded individuality, yet never losing sight of the equally important fact of interdependence.

It is a very, very long time since there was only one person in the world, and everything has grown into such conditions that there can be no true happiness or development, until we have recognized the fact that we belong to the great world family, that the same great life pulses through us all. It is hard to acknowledge this, but we must, and it is only when we know that, as we all rise, the true heaven will come, that we begin to appreciate our position as mothers.

A kindergartner said to me, not long since, "I do not look for great results from kindergarten work just at first; we are planting the seed, but," and here she smiled, "the kindergarten children of this generation are to be the fathers and mothers of the next, and after a while, after a few generations have slowly grown into the thought of all around development, what a world we shall have! How I wish I might see it." She was right. Ideal mothers and fathers could, and will, make an ideal world, and we cannot afford to scorn the least effort to bring about this happy consummation.

It is our duty as mothers to know and judge of the different methods of education. We have no right to be ignorant. We are engaged in the noble work of making worthy, true citizens, for a worthy, grand country. We must not treat our position as though it were an accident.

Would voting make us any the more the mothers of our daughters? Is it possible for any one to have a higher mission than to be the mother of noble daughters? Men will be just as noble as the women who are their wives. There is sometimes an exception, but take the average man, he is just as good as his wife expects him to be. We cannot hide our shortcomings by saying how much better we should be, if we could only vote and if men were better.

Froebel's idea has taken hold of the world, and if we can get it into our own hearts and the hearts of our daughters, we shall have taken a long step toward being ideal mothers, and making ideal mothers of our daughters. His thought, briefly stated, is, that to every mother is given a little bundle of possibilities. We can make of that little bundle a good child or a bad child. To develop the possibilities for good, that is the work of mothers; to crowd out the lower desires by filling our little ones with such holy, happy thoughts, that there is no room for anything else. Can any work be higher? Who can say she is fitted for such a post? We mothers should be the humblest, the most earnest, the most studious and the most reverent people in the world, for we are workers whether we will or no, "Workers with God."

In the morning paper comes this little clipping—it shows us our work is hardly commenced. It is in reference to a poor, brutalized man who cruelly whipped his little daughter to death, and is written and signed by "a mother." She says:

"What shall be done with such fiends? Jackson is too good. Wouldn't it be wise to apply the old law, 'An eye for an eye, a tooth for a tooth,' in such cases? If there are not men with 'gumption' enough in Michigan to whip such fiends to death, I think the mothers could accomplish it. It might not be quite as comfortable as lynching, but it would answer the purpose."

A MOTHER.

Think of the mothers of Michigan going out to whip, even a fiend (if there is such a thing), to death! The brutal murder was terrible, but is not the remedy proposed much worse? Could two wrongs make one right?

Friends! let us look the matter squarely in the face. There are terrible wrongs in this world, and fearful ignorance and brutality. It is no sentiment that is needed, but work.

It is hardly necessary to tell farmers' wives that the way to accomplish anything is "to work," but there is another side to their lives which sometimes is not fully appreciated; they have so much time to think. The reason so many of our best men have come from the farm and country life is because they had time to think.

These Institutes and these women's meetings are grand, and it is because you will have time and quiet to "ponder these things in your hearts," that the best help the world will receive in the great fight with brutality and ignorance will come from the ideal mothers in our country homes.

A PHYSICIAN'S COUNSEL.

DR. MARIA W. NORRIS, GRAND RAPIDS.

I wish I might impress upon you ladies today the importance of absolute confidence between a mother and her child, not only as to the joy and blessedness it gives personally, but as to the future results upon coming generations. I wish I could go into the details of character building from a scientific standpoint, showing you how the tiny, delicate, ingoing nerve cells make their impression upon brain cells, and how the out carrying nerves report by thought and action just what the message has been, good or bad. I wish I might tell you how, when proper stimulus is flashed, the brain cells receive high, holy and lofty impressions that give by out carrying nerves external evidences of virtuous character.

I wish you might understand that the physical basis of a vicious life is but the stimulation of such nerve cells that waken a host of accustomed activities, such as vile memories, evil thoughts, depraved appetites, having well worn routes through or by the out carrying nerves that quickly respond in deeds of like character. Every voluntary action, good or bad, beats a path for its fellow action to follow, until nerve cells become "specialized," until they cannot transmit an impression except in certain directions; hence the importance of starting right impulses over these nerves, of keeping the track clear, so to speak, for right action, until good habits are formed instead of bad--nerves specialized for the right, instead of the wrong, way of thought and action.

I believe it the part of wisdom to teach little children the pure truths of science in regard to the beginnings of life; the wonderful mystery and miracle of birth, which grows to me more and more wonderful as I reverently watch its process.

There are two books that I am glad to mention here today and also to recommend as being very helpful in teaching the truths of sexual life to young people: "Reproduction," by Edmund A. Cook, and "Plain Talks," by Dr. Guernsey; both of these books can be bought at Boericke & Tafel's Homeopathy Pharmacy, 44 East Madison street, Chicago.

I must say a word about unwelcome children—and there are so many—not conceived because of a wish or desire for a child, but only the gratification of a beastly passion that God meant should be pure and holy, and but for the reproduction of life. When the possibilities of a child, conceived and born because it is desired, is placed against one that is but the result of passion, and the two are watched in their development, the difference is so marked. One is all that can be desired in a child, the other all that is undesirable.

For half an hour Dr. Norris replied to a multitude of questions asked by the ladies in the audience upon live topics that reached every mother's heart.

LECTURES BY STATE SPEAKERS

NOT DELIVERED AT THE ROUND-UP.

The following are abstracts of articles which were given at a large number of institutes during the winter, but which, for lack of time, were crowded out of the Round-Up program:

OBSTACLES TO ROAD IMPROVEMENT; CAN THEY BE REMOVED?

PROF. H. K. VEDDER, AGRICULTURAL COLLEGE.

From inception to construction, from the first desire for something better to the final completion of solid roads, there are difficulties to be met at every turn. There are two periods in the history of any road. The first includes all the time from recognizing the need of a given road up to the beginning of its construction, and the second is concerned with the actual building, the methods, materials, etc. What follows is an attempt to consider only the difficulties met in the first period, the things that interfere with any project looking toward improvement, with some suggestions for their removal.

Perhaps it will tend to clearness if there be offered a list of hindrances that seem to me to stand in the way of successful organization and improvement, followed by a brief consideration of each. On this plan I submit as the chief obstacles:

1. Lack of interest and need of awakening to the advantages and profitableness of good roads.
2. The fact that roads cost money.
3. The fact that roads cost thought; that is, good roads do, and therein is an important difference between good roads and common roads.

4. Defects, real and imaginary, in the road laws, and especially in the county road law.
5. A prejudice against the bicyclists.
6. The general incompetency of the existing personal labor tax system of road improvement.

When, a short time ago, Gov. Rich was asked the question: "What do you consider the main obstacle to road improvement?" he replied, "I think, above all other things, lack of interest and failure to appreciate the benefits of good roads." No doubt the greatest trouble lies here. While there seems to be a pretty general sentiment abroad that our public roads are not just what they should be, still people are divided into two classes regarding the desire for better ones. There are those who are ready, even anxious, to discuss ways and means, legislation, taxation, etc., with a view to attempting something better if it can be shown to be profitable. But there is another class—those who think good roads are no advantage, however little they may cost. "What was good enough for our fathers and grandfathers, is good enough for us," they say, and there ends the argument. Such apathy can only be remedied by continued and energetic activity on the part of those in the first class, backed by an exhibit of the economic and educational advantages accruing from improved roads, as well as considerations of health, safety and comfort.

A QUESTION OF MONEY.

The road question is preeminently a question of money, and will work itself out on a money basis, if at all. However desirable it might be to have perfect roadways all over the nation, they will not be provided unless it can be shown to be a good investment, a profitable undertaking. Many of us believe that in many places time, comfort and money are being lost because road improvement is not begun. The majority of the people concerned do not agree with us, else I am satisfied the improvement would begin. What is the trouble? In my opinion, with all the agitation there has been, there has not yet come a period of examination of the scheme whereby the individual shall satisfy himself of the profit in it, as he always does before making any considerable investment.

I can get little satisfaction from the discussion of problems involving too general data; as, for instance, considering the whole number of horses owned in this nation, more than 16,000,000, and trying to show that bad roads cost yearly $15 per horse; or, in the aggregate, $250,000,000, chargeable to bad roads. No doubt such methods of figuring for the promotion of road improvement are legitimate and the results obtained are correct, but it is infinitely more persuasive to me to have figured out a problem into which enter only the conditions immediately at hand. Such a problem was presented to me a few weeks ago, and I was surprised at the results. I happened at the time to be visiting a friend in a neighboring state. He is a farmer, pretty generally alive to his interests, and an honest man. I say this in advance of your forming an opinion of him from what follows: I asked him if he was interested in good roads. He answered, "I would like to be, but I can't afford to be. We need better roads; no question on that point. My boy and I have just lost a week's time waiting for the road to get into shape so that we can haul the wood that my men cut earlier in the winter. Besides, I have no doubt I have lost this year an amount equal to several dollars per head on my dairy, because, owing to the general condition of the roads, I have not been able to carry the milk to the condensing factory, where a higher prices is paid than at the cheese factory near my farm."

A LITTLE FIGURING.

I thought he had contradicted himself quite plainly on the point of not being able to afford improvement, but I asked him if he had taken the trouble to figure out the matter on a profit and loss basis. "No," said he, "I haven't thought it worth while." Well, I suggested that we take five minutes to figure together on the question, he to furnish such information as he could on matters of fact and taxation, and he agreed. This man lives in a township of a state in which the plan of road repair is that known as the "personal labor tax" system, the same as that in vogue in Michigan. His township maintains forty miles of roads, not one mile of which is what should properly be called "permanent road." I asked my friend how many days' work he was assessed for roads. "Ten, on the valuation of one farm," said he. "*How much of that do you work?*" I asked next. Then there was a period of hesitation, but finally he answered, "Well, I think there are only three days to my credit this year." "Did you work yourself?" "Yes, one day I went out, and half that day we spent in Mr. J's barn, waiting for the road scraper. For the other two days I hired a boy at fifty cents per day."

I have said that this is an honest man, and so he is. The trouble is not with the man, but with the system, which is characterized by an Ex-Secretary of Agriculture as "unsound in principle, unjust in operations, wasteful in practice and unsatisfactory in results."

But to return to our problem. My friend believed that to secure good roads all the year round, he could well afford to pay his road tax in money at $1 per day, or even more, and he believed most taxpayers would agree with him. There being 3,500 days assessed in the township, a money tax would amount to $3,500. Of this perhaps $400 would suffice to maintain forty miles of "permanent roads," for a good authority (Mr. A. J. Cassatt) states that the cost of maintaining a good macadam road, under the wear of rural traffic, is not over $10 per mile yearly. The remaining $3,100 is, in a sense, therefore wasted, and its capitalized value could well be spent in improving those forty miles of road. At 4 per cent, nearly $78,000 would be provided, a sum large enough to build more than forty miles of first-class macadam road.

But besides costing money, roads cost thought. Do not misunderstand me. I do not believe that extensive outlay for improving roads is warranted in all sections. Certainly it would not pay to pave all country roads with brick. I do not believe we can afford broken stone roads in general. But, given the desire, and a determination to make the best of the materials at hand, and much can be done, if the materials are applied by a man who thinks. When the people begin to think they begin to desire good roads. If they continue to think they consider the matter as they do any other economic problem or a business venture; and so on—when thought drops out at any stage of the proceedings we find a mudhole or an assortment of bumps and ruts.

THE COUNTY ROAD LAW.

Now as to the county road law. I have heard that document denounced on all sides. "It is a scheme of the cities and towns to get good roads at the expense of the country," says one. "It puts too much power in the hands of a few men," says another. "Too much chance for favoritism," and so on. Are these just criticisms? If the first is, i. e., that the cities are to be benefited at the expense of the country, then my thought on the subject has led to entirely wrong conclusions, for I must believe that any county having within its borders a number of considerable centers of population and wealth, will be making a good use of that wealth in taxing it for road construction. The second objection is more reasonable, has more foundation in fact. Public office is too often a private "snap," and as the law now stands there are chances for advancing private selfish interests, of showing favoritism in the location of roads to be improved, of expending money for political ends instead of for the public good.

An unfortunate circumstance of our law is the prohibition which exists against allowing State aid to any project for road improvement. I believe that my extensive betterment must begin as a State enterprise. That, however, is not likely to occur in the near future.

What then is to be done in the meantime? How shall we get most useful service from the means at hand? In the first place, last place, and all the time, continue the agitation now well under way, and let hard thought accompany the agitation. Let us hope that our pathmasters will think too, if we must have them. But when I meet this point I feel that we were better off without them, better off without the system. "What is everybody's business is nobody's business," applies very forcibly to our present system of road organization. A satisfactory solution seems to lie only in an entirely new system. Even that contemplated by the county road law is better it would seem. The authority is in the hands of men who are naturally more given to thinking. The great point is to "mix brains with the road material."

THE BICYCLIST.

As to the bicyclist, the sooner he is accepted as a happy factor in the problem, as an aid to the construction of good roads, the better it will be for all concerned. Any amount of feeling against him will not remove the fact that all he really needs is a path six inches wide along any roadway, and he generally finds that strip however poor the road may be. If then he is willing to join hands with the farmer and the merchant in improving the whole width of the road, he can hardly be accused of unmodified self-interest.

We believe that the American people have the brains, pluck, perseverance, skill—all the qualities necessary to the successful carrying out of any great enterprise. We believe them able to do anything ever done before, just a little better than done by any other nation. If there were no other moving incentive than this national pride, it were strange if we did not sometime excel in the matter of roads and road making. In no other direction have we been content to wait so long for action.

THE HORSE AS A FACTOR IN CIVILIZATION.

A. W. HAYDON, DECATUR.

The domestication of the horse, whether it occurred in modern or prehistoric times, must have given man a new sense of independence and power, and inspired him with hopes, ambitions, and possibilities of advancement. Until recently there were no societies or laws for the prevention of cruelty to animals. The sufferings and abuse of the horse awakened the sympathies and aroused the indignation of humanity in his behalf, and societies have been formed and laws enacted all over the union. These in turn have been the parent societies to numerous others for the protection and relief of suffering humanity.

The event of modern times that overshadows all others for the progress of the race was the establishment in this country of a government of the people, and second in importance was the proof of its stability as the outcome of the great war of the rebellion. The armies of horses, like those of men, were part of the engine of war, and together they fought, suffered and died for the triumph of the most sacred rights of man. His horse gave added power to a leader to inspire enthusiasm, courage and patriotism in the hearts of his followers, and they deserve to be gratefully remembered for their aid in the establishment and preservation of the nation.

The era of knighthood, the age of chivalry, could not have existed without the horse. The mail-clad knight could not and would not have gone forth on foot to right the wrongs of the world. Whatever may be said against the age of chivalry, it must be credited with having given to the world higher ideals of honor, justice, and the devotion and respect due to woman than it had ever known before. The age of chivalry, with its armor and lance and battle-ax, long since passed away, but the exalted ideals it set up will never pass away, but in the future, as in the past, will aid in building up the highest, purest and noblest type of manhood.

Not only has the horse thus contributed to the advancement of woman, but his extended use by her in recent times has developed the health, the strength, the courage and self-possession that better fits her for the higher duties devolving upon her in our advancing civilization, and will hasten the realization of that greatest and most important movement of all time for the elevation and advancement of the human race, the emancipating of woman, and the investing her with every right, privilege and opportunity possessed by man anywhere.

IN MATERIAL CIVILIZATION.

Thus far I have sought to show the influence of the horse on the character of man in developing the better and nobler sentiments of his nature. Now, as to our industrial and material civilization, the most wonderful ever achieved by mortal man. How far has the horse been a factor in its growth? I must answer by asserting what I have not space to prove in this brief abstract of my talk, that *there is not a thing which civilized man eats, drinks, wears, or uses,* aside from wild spontaneous products of nature, in this country, *which the horse has not helped,* directly or indirectly, *to produce or transport for the use* of man. Myriad dishes to tempt the appetite are prepared from the grains, meats, fruits and vegetables produced in part by his labors. The same is true of our artificial drinks. You cannot even take a drink of water in all the United States without being under obligations to the horse, without you get down on your hands and knees and drink out of the spring. What an amount of horse power there is in cider, all the way from the planting of the apple seed to the straw through which the boys delight to sip it from the vat. The labor of the horse runs through every thread of every garment worn by this audience today, whether of wool, cotton, linen, silk or shoddy. There is nothing of wood, iron, stone, brick, mortar, or glass, composing this immense building, that the horse has not helped to produce or place upon the ground.

The same is true of every home and building in all the land. He has helped to construct every rod of our thousands of miles of railroads, of our millions of miles of common roads, and our hundreds of millions of miles of fences, and our schoolhouses also, and churches, and our factories and all they produce. He plows about 200,000,000 acres annually. He drags and sows and cultivates and reaps and mows it, and his labor is in every one of the five billions of bushels produced, and in every one of the fifteen billion dollars worth of total annual products of this immense land. He contributes a service too great to be measured in dollars and cents, in his efforts for the comfort, convenience and happiness of man. If "He who causes two blades of grass to grow where but one grew before is a public benefactor," how much more is it true of him who causes two smiles to grow where but one grew before? And this has been the mission of the horse throughout all the ages of his domestication.

THE PRESENT CONDITION OF THE HORSE BUSINESS.

In this brief summary I have tried to show how far the horse is a factor in the civilization of today. How stupendous is the work? How is its accomplishment possible? You say by machines, the result of the inventive genius of man. But machines can do nothing without motive power. Aside from man himself, the horse furnishes the great bulk of that power. With this array of facts before us, what shall we think of the hue and cry that "the horseless age is upon us;" "The horse is about to become extinct." Is it not the veriest nonsense in all the world? Granting that there are no limitations to the possibilities of the human mind, is it not most unlikely that a substitute for the power that overshadows all others in amount and infinite variety of application can be devised in our day or our children's day? Old age, neglect and abuse, the call for hides, for glue stock, for canned beef and dried beef, are fast thinning the equine ranks to a point where the supply will be less than the demand. With returning prosperity, the demand must increase. Where are the colts to supply the places of the horses now in use? Nowhere. They are not born yet, and they can't be raised as soon as they will be needed. Are we not likely to have a horse famine, with prices soaring away up in the "ethereal blue?" Don't be caught empty handed, get ready, save the breeding stock, mate judiciously, lay anew the foundations of this great industry, and you shall have your reward.

I have tried to present the claim of the horse to the gratitude of the world; to revive hope in your hearts as to his future; to say something that might do you good.

In conclusion, I thank you for your attention. If we never meet again in this world, I suppose if you ever think of me at all, it will be to associate me in your memories with the horse. That's all right. I always did aspire to move in the best society. I long ago ceased to look upon the horse as a poor soulless brute, but rather as an unfortunate undeveloped brother. Are we not all children of the same Great Father? Are we not all built on the same general plan, with the same five senses, with like organs of respiration, circulation, digestion, secretion and generation? Has not the horse a brain that thinks and reasons, not as the developed brain of enlightened man does, but in its rude elementary way does it not reason? Is not that brain the seat of the imperial will that controls every movement of his body as man's will controls the human body? By what analogy then can we reach the conclusion that he has not an immortal soul?

My friends, if we will all of us labor as patiently, faithfully and cheerfully for our fellowmen as the horse has done through long ages of the past, this world will be a better and a happier place to live in than it is today.

A TALK ON THE HONEY BEE AND BEE-KEEPING.

R. L. TAYLOR, LAPEER.

In order to interest those who do not keep bees as well as those who do, I attempt to speak in a popular way of the inmates of the hive, and their works and ways. The invention of a practical movable comb forty years ago made the study of the mysteries of the hive so easy that any one who is interested may look into them without difficulty.

As with other animals, bees are male and female, but unlike most others there are two classes of female bees, workers and queens. The male bee is called a drone. In a normal colony, the workers are always much the most numerous, varying in good colonies according to the season from ten thousand to seventy-five thousand. They are made to vary from queens by the manner in which they are reared. A cramped cradle and scanty feeding prevents their full development, so that ordinarily their reproductive organs are entirely unfitted for their proper use, but instead their eyes, tongues, jaws, honey-bag, glands, legs, etc., are wonderfully fitted to enable them to gather material and perform all the work of the hive. This is their sphere and these labors are performed by them alone. When the hive contains young and old workers, those from ten to fifteen days old and under do the work inside the hive, and those older the field work. The field work consists of the gathering of nectar for honey, pitchy material for bee glue, pollen for bee bread, and, when no nectar is to be had, water for diluting the honey to prepare it for food. Nectar is the secretion of a great variety of flowers and is gathered by the bees with their long tongues and deposited in their honey sac until that is filled, when the load is taken to the hive and deposited in the comb. At first it is generally very thin, but by the heat of the hive and the fanning of the bees it is evaporated to the consistency of honey. The bees do not make honey properly speaking, they simply gather and evaporate it and add a little formic acid to preserve it. In central Michigan the nectar is usually found most abundant in the blossoms of maples, fruit trees, white clover, basswood and fall flowers, such as asters, boneset, goldenrod, etc.

GATHERING POLLEN.

The pollen or fertilizing dust of the flowers is gathered, often in connection with nectar, for food. It is the muscle building material, and without it or some substitute, as flour, no brood can be reared. It is in the gathering of pollen that the bees perform the office of cross-fertilizing flowers, a function of exceeding importance to farmers and fruit growers in the production of seeds and fruits. The pollen is packed by the bee into its pollen baskets, one of which it has on each hind leg, for transportation. When the bee reaches the hive with its load, it repairs to the proper cell, backs into it, and rubs its legs together until the pellets of pollen are loosened and fall off, and another bee coming along packs them by pressing them down with its head. The wax for bee glue is also carried in the pollen baskets. It is called propolis and is obtained principally from the buds of certain trees and shrubs. Its practical use is to fill up cracks in the hive.

Inside the hive the chief work is the feeding of the brood, the production of wax, and the building of comb. The food is prepared by partially digesting honey and pollen mixed. When ready it is a thickish milk-like substance, a proper proportion of which is supplied to each larva in its cell. The beeswax for comb building is not gathered, but is secreted by the bees from honey consumed, just as the cow secrets milk from the hay and grain she eats. The wax appears in small thin tablets in the wax pockets of the bees, six of which she has on the under side of her abdomen. Comb is built with this wax mixed more or less with pollen and lint. The workers also do all the house cleaning and police duty. They solve the tax question by executing summary justice on robbers and turning the aged, sick and crippled workers and useless drones mercilessly out of doors, and so tolerate neither courts, asylums, nor prisons.

THE QUEEN.

The queen, so called because she was formerly believed to rule the colony, is the only fully developed female. Her one office is the production of eggs, from which are reared, as a rule, all the young. The drone is the male bee. A gentleman of leisure, he does no labor. In fact he could not, if he would. He has no tongue to gather nectar, no honey sac, no wax pockets, no sting, no pollen baskets. His only use is the fertilization of the queen. Here is a problem for those skilled in the doctrines of evolution and heredity. How did the worker bee, with such a father and such a mother, with no ancestor for unnumbered ages back that ever did a stroke of field or house work, come to be the skillful, industrious being she is?

On the advent of spring the strength of colony is at its lowest ebb, and the object then in view is to increase its numbers. About the first of April the queen begins to deposit eggs in worker cells which are one-fifth inch in diameter, while the drone cells are one-fourth inch in diameter, one egg in each cell. She soon lays as many eggs as the cluster of bees can cover and keep warm. In about three days the egg hatches; in about six days after that the larva is sufficiently fed and so large that it more than half fills the cell and is capped over, and in about twelve days thereafter it emerges a full grown worker—about twenty-one days from the laying of the egg. As fast as the cells are thus made vacant, the queen again supplies each with an egg, and as the bees increase in numbers the circle of the brood increases, until in June a good colony has its hive three-fourths full of brood, and the queen is laying 2,000 to 3,000 eggs per day. Sometimes before that, if everything is prosperous, the first preparation is made for swarming by rearing drones—sometimes in large numbers if drone comb is not restricted by the apiarist. The drone emerges from the cell in about twenty-four days. When the hive is crowded with bees, and honey is coming in freely, further preparation for swarming is made by the production of queens. For these special cells are made. First they appear like a small acorn cup, the open side downward, in which the egg is laid; the cell is then enlarged downward and abundantly supplied with food, and when capped over resembles somewhat a common peanut. The young queen grows quickly and is ready to emerge in sixteen days from the laying of the egg. There may be a dozen or more of these cells in different stages of progress. About the time the first cell is capped, if everything is favorable, a swarm issues, the old queen and the older bees going out. In about a week the oldest young bee emerges and in a day or two issues with a second swarm, unless the bees have concluded to swarm no more, and have destroyed the other queen cells.

The young queen, usually when a week or ten days old, flies out to meet the drone, and when once mated she is fertilized as a rule for life, and goes out no more except with a swarm. Curiously enough, fertilized eggs produce workers or queens, if unfertilized, drones, and the queen appears to control the fertilization at will.

The workers live only six or seven weeks during the active season, and seven or eight months during the quiet season. The drones probably live three or four months sometimes, but seldom, if ever, over winter, while a queen lives from three to five years.

READING IN THE FARM HOME; HOW MAKE IT MOST PROFITABLE?

PROF. A. B. NOBLE, AGRICULTURAL COLLEGE.

[Extracts.]

To the thoughtful, reading brings rich rewards; but to many it is little better than an idle pastime, or even a mental dissipation. The benefit is commensurate with the amount of thought called forth, not with the number of pages turned. Whoever wishes to read with most profit, must think; he must think not only while he reads, but must also

THINK BEFORE READING.

This he must do in order to guard against injury to character from pernicious reading, such as the details of scandal and crime, so unblushingly and constantly thrust before us by the modern newspaper, or the pictures of vice made attractive, as in one class of novels. He must think before he reads, in order to guard against loss of time from reading what does not profit, and the consequent loss of opportunity. The repeated loss or waste of opportunities is sufficient to account for many a failure, no less in storing the mind with useful facts than in lining the pocket with dollars.

AIMLESS READING

of whatever chances to come to hand, stores the mind with rubbish—facts we do not need and cannot use—and is liable to weaken its original power. What farmer gives barn room to all the rubbish that might be picked up about the place? What reader can afford to give mind room to all the rubbish that may be picked up in reading?

LISTLESS READING

breeds a habit which sooner or later will cast its benumbing influence over all our reading, even when we read something of real importance. To derive due benefit from reading, the mind must be alert and vigorous, ready to seize, digest and assimilate, to test and apply, each idea brought forth.

FRAGMENTARY READING

is little, if any, better. Though it may not burden the mind with rubbish, it frequently makes it a mere storehouse of odds and ends, of facts that lack coherence, facts that remain as unconnected as when from a thousand various sources they first came into the mind. To perceive the full significance of facts which come to us one by one, with months or even years intervening, we must bring them into order and system, so that each will fall into its place and be forever after inseparably associated with all related facts previously gathered. Now the only reading that promotes the formation of this habit is orderly,

SYSTEMATIC READING.

To gain the best results, the mind should be trained to long tasks, to steadiness of attention to one subject for an hour or more at a time, and readiness to return to the same subject again and again until it is mastered. The habit of assorting and associating ideas relieves the memory, because henceforth the recalling of one idea brings with it all the related ideas. This habit also renders thinking more easy and the conclusion more valuable, for the dozen related facts assume a new significance when seen side by side. When thus conducted, reading gives tone and quality to the mind, enables it, by grouping and systematizing masses of detail, to grasp large subjects, and to think a subject through to its conclusion. Such reading richly repays whatever time and effort may be given to it, for reading such as this is thinking, and thought rules the world.

IN SELECTING A PAPER,

what should be the primary consideration? Not size, not cheapness, but quality. In all that a paper has to offer, quality is of first importance: Are the news items authentic, or are they conjectural, or still worse, sensational? Is prominence given to what deserves prominence? or is a brawl or scandal treated more fully than some clear-headed, warm-hearted attempt to improve the welfare of the community or state? Who are its contributors? Are they men such as you would consult if you had the opportunity? Are the editorials able? and above all, are they fair? for comment that is written from an unfair or prejudiced standpoint is an injury to every reader. These tests apply to all papers, farm, educational, and religious, as well as newspapers. A column of weak or commonplace matter takes as much of the reader's time as one of deep insight and suggestive power. We should take the best, even though it costs a little more.

MAGAZINES AND REVIEWS

give us the fresh product of the best minds of the time on all the leading topics of the day. The reviews are neither partisan nor sectarian, as most papers are. They bring us the arguments of the best debaters on both sides of all leading questions, and train us towards breadth and fairness. The magazines broaden our horizon and enlarge our sympathies by giving us descriptions and pictures of every land and every people under the sun. To do without these periodicals is to close our ears to the choice thought product of the wisest and the best. For all that makes reading most valuable, one good magazine, say Harper's, the Century, or the Atlantic, or one good review, say the Forum, or the North American Review, is worth a score of newspapers.

THE CHOICE OF BOOKS

demands care and thought. Some few books are known the world over as classics; about others there is substantial agreement that they are the best of their time or of their kind. But even a classic may seem—nay, may indeed be—unprofitable to one whose interest lies elsewhere. "Read what you are interested in," is the best precept, for where there is no interest there can be little profit. We should not forget, however, that our present interest may not be for those things that are highest and best, and hence we should strive in every way to cultivate our taste. To be directed to what, in the opinion of competent judges, is really highest and best, we must give some time to reading about books. Guides to reading are multiplying on every hand and some of them are well worth getting. (See short list at the end of this article.)

COURSES OF READING.

The Chautauqua Reading Circle, University Extension work, and similar movements owe much of their value and popularity to the fact that they furnish good courses of reading, and also direct attention to topics demanding especial study, and suggest methods of making the reading most profitable. A few hints, suggestions, and questions, skillfully designed to call attention to the central points, may prove of great value to any reader, especially to one who has not had careful training in literary interpretation. Without such helps many a reader has failed to grasp the inner meaning, the deeper significance of volumes that are full of riches to one whose eyes have been trained to see.

CLAIMS OF LITERATURE UPON THE FARMER.

The farmer is endowed by nature with the same faculties, tastes and interests as are other men. If others find interest and profit in biography and history, in essays and poetry, in the novel and the drama, why may not the farmer find equal interest, equal profit? He cannot afford to make of himself a mere muscular, money-making machine. He has mind and soul, and should keep in touch with whatever can lead him to a wider usefulness or a nobler manhood. If it is excellent to know about beast and bird and plant, surely it is not less excellent to know about man. Knowledge of the right conditions for plant growth may be coined into dollars; in a like manner, knowledge of the right conditions for man growth may be coined into manhood, and who dares affirm that character is a less worthy ideal than wealth? Now literature is, in its broadest sense, little else than a study of man. History and biography show us what man has accomplished. The drama and the novel show us what man is: his real character; his secret ambitions and hopes and fears; the impulses that sway him, now here, now there; the motives that prompt him, now to crime, now to a life of unremitting toil, now to deeds of heroism and self-sacrifice. The essay takes for its task the discussion of all problems affecting man's welfare; on many subjects it includes the ripest product of man's thought. Poetry presents to us the finest emotions and sentiments, the highest ideals that man has yet conceived. Through it all, if we but listen, we shall hear one dominant tone—man. Always it treats of what is most significant to man—character, and progress, and ideals. Surely the farmer who thinks will not esteem lightly the claims of literature.

READING, AND THE "MONOTONY OF FARM LIFE."

If farm life seems to some monotonous and unattractive, may this not result, in part at least, from the fact that it is so shut off from a view of other occupations, other classes of people, other topics of thought? The mind grows tired of contemplating one thing constantly; a glimpse of something else, even for an instant, is a relief. Now, reading, if properly selected, furnishes an opportunity for all—father and son, mother and daughter—to turn aside from the daily routine, which, too closely followed, is liable to become monotonous. By the help of illustrations, books and magazines enable us to see in imagination the great wonders of nature—the Yosemite Valley, Niagara Falls, the Alps. They picture to us other peoples, other lands, and other times. By their help we may transport ourselves in an instant to some great historic spot, stand in the presence of kings and statesmen, listen to poet and priest and orator. With such opportunities open to all, who that cares to read, need complain of the monotony of farm life? An hour in the evening will make one forget whatever of dullness or monotony there may have been in the labor of the day,—it will give that restful glimpse of something else. More than this: if the reading is well chosen, these glimpses are well worth seeing and well worth remembering; for they present to us grand sights, noble men, heroic deeds, inspiring thoughts. To have invited into our home such majestic guests as these, is to have made that home brighter and richer and happier. To have brought the great men of the past into clear view, so that we have entered sympathetically into all they said and did and yearned for, is to have caught somewhat of their spirit, their greatness, their nobility.

Such glimpses of all that is grand, and noble, and pure, we may have in our homes, *if we will.*

NOTE.—*Guides to Reading.*

Lowell's "Books and Libraries"—Houghton, Mifflin & Co., price 15 cents.
Phillips Brooks's Lecture on "Biography"—Ginn & Co., price 10 cents.
Stopford Brooke's "Primer of English Literature"—Am. Book Co., price 35 cents.
Richardson's "Primer of American Literature"—Houghton, Mifflin & Co., price 30 cents.
Frederic Harrison's "The Choice of Books"—Macmillan, price, paper, 25 cents; cloth, 75 cents.
Moulton's "Four Years of Novel Reading"—Heath & Co., price 50 cents.
Anna B. McMahan's "Study Class"—McClurg & Co., price $1.00.
Mary E. Burt's "Literary Landmarks"—Houghton, Mifflin & Co., price 75 cents.
C. K. Adams' "Manual of Historical Literature"—Harper Bros., price $2.50.
Allen's "Reader's Guide to English History"—Ginn & Co., price 25 cents.
Scudder's "Literature in School"—Houghton, Mifflin & Co., price 15 cents.

MILITARY TRAINING AND ITS RELATION TO CITIZENSHIP.

LIEUT. E. A. LEWIS, AGRICULTURAL COLLEGE.

I propose to talk tonight upon the obligations of citizenship; the duties which each man owes to the community in which he lives, his state and his nation. And I shall speak more especially concerning the just demands which each state may make upon the individual in the way of military duty.

At no time in the history of our country has there been a greater need for good, honest citizens. It is the general belief that great corruption has entered into our national life, there is a great distrust of political parties and of the men whose names are associated with these parties, and the public conscience is so diseased that honor, worth and ability fall before the methods of the politician. We are confronted with another great danger. For many years the strife between capital and labor, so called, has been waxing more bitter, and each year sees us drawing nearer to the time when organized labor and organized capital will meet in terrible conflict. The problem here presented is an important one. The statesman may be able to solve it. Our courts may be strong enough to uphold the dignity of our laws. Nevertheless, it is but the part of wisdom to prepare for the failure, for a time, of our laws.

These two questions, political honor and social justice, are the greatest before the American people today; and such is their magnitude that I repeat my statement, that at no time in the history of our country has there been a greater need for good, honest citizens—for patriots. Now the virtues of patriotism may be thus defined: "Love of country, that devotion to country, its rights, liberties and institutions, that prompts to their defense, and looks to their welfare." And this definition must be understood to apply to the community in which each man lives, to the state and to the nation. It is my intention to only hint at the obligations and duties that fall upon members of a community to attend primaries and work for clean men for office, to vote for those men at election, to support them in a faithful execution of the laws, and to set a worthy example of honesty and worth. And someway, I believe, it will work out, that when each little town, and hamlet, and district, is well served by faithful officials, that our national life will grow pure and wholesome.

But one of the elements of patriotism is that which leads to the defense of country in time of peril, and prompts to preparation for such times. I know there are some before me who say that we will never have any more wars, the world is too far advanced, and anyway, if it was not, war has become so destructive that it cannot again occur. Now, I do not know just when such talk began. It was common before the war of the rebellion, and no doubt lengthened the war by years, and added hundreds of thousands to the list of dead and wounded. It was heard when gunpowder was invented, and I have no doubt it was heard when our ancestors, discarding stones and clubs, brought the bow and arrow upon the field of battle. I hope we will have no more war, but who can say that our country will maintain its honorable standing in the world without armed conflict; or who will say that we may safely cast aside all preparation for national defense.

In time of war the safety of our country must rest with people; our homes must be defended by the volunteer armies that would rise at the call of our President. But war is a complicated science, and the art of handling troops comes only with deep study and long experience. It is necessary in time of peace to educate the body of our young men in the elements of the soldier's profession. And upon each young man who enjoys the benefits of our free institutions is laid that obligation to defend, if need be, his country, and to prepare himself that he may intelligently do so. It is the duty of all to cultivate patriotism and to make the evidences and emblems of patriotism honored and respected. Our youth should be encouraged to enlist in the national guard of the State, the uniform should be an honorable badge, entitling the wearer to increased consideration; those little badges upon the breast of our soldiers should be passports to our goodwill, our kind treatment, and our thoughtful respect.

But, though we may not see any foreign war before us, no one can be blind to the dangers from within. That the pleasures, profits and benefits of life are not evenly distributed, no one can question. That unequal burdens are the results of class laws, at least one great political party has long taught. That the machinery of government is all wrong to right evils many people believe.

The teachings of anarchists are scattered broadly over the land, and are widely read by those easily influenced by such arguments as they find therein. Mingling with our people, especially in the large cities, we have a class of men who would overturn, by fire and bloodshed, every existing order of things.

The anarchist, and in that class I include all that mass of people who believe that liberty is absence of law—the anarchist is ready at any moment to precipitate a bloody social war, through which none of our present forms of government shall live.

Above the anarchist, distrusting all that he teaches, and in no way in sympathy with his doctrines, we have the great mass of people, the laborers. And yet the laboring man, under intense excitement and great provocation, is too often inclined to employ the methods of the anarchist to right private wrong by great public harm. The strike and boycott, on a large scale, are almost synonymous with bloodshed, riot and ruin. Our civil law has often failed in times of great peril. The future promises only more terrible conflicts, and if our country is to be preserved, its laws must again and again be upheld at the point of the bayonet. The national guard of the various states has been repeatedly called upon to suppress disorders. Its services will be needed more in the future than in the past. A military training for our young men seems so necessary that its utility cannot be called in question.

I want to speak briefly of some of the benefits that flow from a systematic military training, and to more clearly illustrate my remarks I will give the aims and results of the military department of the Agricultural College.

The technical training is such as will enable a graduate to properly fulfil the duties of company officers. The soldier has for all time been taken to represent the perfect type of disinterested devotion to a single cause, and a minister of the gospel esteems it highest praise to be called a "soldier of the cross." The aim of all military training is to make men —good, honest, reliable, patriotic men—and there is a constant effort to cultivate in the students all those virtues that go to make men.

Obedience to law with perfect self-respect, consideration for those in inferior positions, kindness with firmness, habits of self-control, are some of the good results of the course in the department.

Not least in benefit to the student is the development of the body, and for those who come from farms where the work has been mainly along one line, the training is especially good. It is good for a man to have strength, but it is better to know how to use the strength he has. And the various exercises and movements upon the drill grounds soon give increased control over the muscles of the body.

The military department is a part of the College which aims to follow closely along the lines of practical education. The function of the department is to make good, law abiding, patriotic citizens.

CENSUS AND OTHER STATISTICS.

ROBERT L. HEWITT, LANSING.

The program says I am to speak upon "Census and other Statistics." As a matter of fact I will confine myself, upon this occasion, to census data. What are statistics? The answer is, statistics are definite statements of facts, or facts systematically arranged or compiled so that practical men can make practical use of them. The census of 1894 is the most complete census ever taken under State authority. What does it show that is of value to the people of Michigan? We shall not have time to make deductions to any large extent. We will present facts as they are brought out by the census, and leave deductions to you. As a starter, the State population is 2,241,641. This was the population June 1, 1894. Of this grand total, 75 per cent are native and 25 per cent foreign born. But the native population with native parents is only 42 per cent of the total. In the southern four tiers of counties, the oldest and most thickly populated portion of the State, it is one-half the total. It certainly is interesting, and should be profitable, to know that sixty years after the admission of the State into the union less than one-half of the native inhabitants were born of native parents.

CITY AND COUNTRY.

The next point to be noticed is the relative proportion of the city and country populations. In 1864, thirty years ago, 16 per cent of the inhabitants of the State lived in incorporated cities; in 1894, 37 per cent of all the population lived in incorporated cities, an increase of 21 per cent. To the student of social questions at least, this is a stupendous fact. Formerly we were considered a purely agricultural people, but with three-eighths of our population living in cities, and the proportion constantly increasing, we can no longer be so considered. Next note the relative proportion of the native and foreign-born who reside in country and city. Approximately, five-eighths of the native inhabitants in the southern counties live in the country, and three-eighths in the cities, while of the foreign-born the reverse is true, three-eighths live in the country and five-eighths in the cities. What the result will be of this aggregation of the foreign-born in the cities is a question well worth study. A writer of a recent magazine article proves almost conclusively that the Irish rule the cities of this country. It is conceded that the cities control the politics of the country. With the foreign-born in control of the cities, and the cities in control of the politics, who but the foreign-born control the country?

BIRTHS.

Study now for a moment the statistics of births. The whole number of births in the census year was, approximately, 60,000. Both parents of 26,342 of these children were native, while both parents of 21,083 were foreign-born. In the foreign population, then, which constitutes but one-fourth of the total, there were four-fifths as many births as in the other three-fourths, or in the native. Having now seen the nativity of the parents of the children born, suppose we go a step farther back and find the nativity of their grandparents. The census shows that the whole number of children born whose parents and grandparents were all native number 10,880, while the number whose parents and grandparents were all foreign-born number 20,080. Now the native population with native parents is 904,881, and the foreign population with foreign-born parents 540,361. The former is one and two-thirds times the latter, yet in the latter there are twice as many births as in the former. So much for the entire State. What of the cities? Here the number of children born whose parents and grandparents are all native is 2,063, while the number born whose parents and grandparents are all foreign-born is 10,631, or five times the former. In this study no account is made of those children born of mixed native and foreign parentage. The statistics will, perhaps, be more easily understood and therefore better appreciated, if we consider the number of persons by nativity who became parents during the census year instead of the number of births. In our native population outside the cities, 1,119,277, the number who became parents is 46,522, or 4.16 per cent, while in the foreign-born, 301,313, the number who became parents is 27,267, or 9.05 per cent. In the cities, of native-born, 3.33 per cent, while of the foreign-born, 10.02 per cent became parents. You will not fail to notice that the proportion of the native was less, and of the foreign-born more, in the cities than in the country. Of the native in the country, 4.16 per cent, and in the cities only 3.33 per cent, while of the foreign-born, 9.05 per cent in the country, and 10.02 per cent in the cities, became parents.

The following facts respecting two localities are most striking: In the city of Grand Rapids, there are 24,578 native inhabitants with native parents, and 25,298 foreign-born with foreign parents. The two classes are, in number, practically equal, yet of the native only 664, or 2.70 per cent, while of the foreign-born 2,315, or 9.15 per cent, became parents during the census year. In Detroit, there are 43,297 native inhabitants with native parents and 92,305 foreign-born with foreign-born parents. Of the former, 1,119, or 2.58 per cent, and of the latter, 8,984, or 9.73 per cent, became parents.

In Detroit, the absolute number of children born whose parents and grandparents are all native was 256, and the number whose parents and grandparents were all foreign-born was 3,826. The latter number is nearly fifteen times the former.

SOME CONCLUSIONS.

From the statistics of births we conclude:

1. In one thousand foreign-born in the State, the number who became parents is two and one-half times the number in one thousand native.
2. In one thousand foreign-born in the country, outside the cities, the number who became parents is more than double the number in one thousand native.
3. In one thousand foreign-born in the cities, the number who became parents is three times the number in one thousand native.
4. The proportion of the native population who became parents is about one-fourth less, and of the foreign-born one-ninth more, in the cities than in the country.
5. The absolute number of children born in the State whose parents and grandparents are all foreign-born is nearly double the number whose parents and grandparents are all native.
6. The absolute number of children born in the cities whose parents and grandparents are all foreign-born is five times the number whose parents and grandparents are all native.
7. A larger proportion both of the native population of native parentage, and of the foreign-born of foreign parentage, become parents in localities where the population is largly foreign, than in localities where it is largely native.

I do not care to make an argument, but perhaps may be permitted to remind you of the strong opposition at present to foreign immigration. I myself am opposed to it. I would not favor restriction, but prohibition, and yet, after a study of the statistics of births shown by the census, I ask myself the question, if immigration be prohibited where will increase of population come from? The birth-rate among native inhabitants with native parents is not largely in excess of the death-rate.

SCHOOL STATISTICS.

Let us now study school statistics. The school population of the State is 699,587, and the number who attended school in the census year, 466,314. The number who attended school in the country was 68.79 per cent, and in the cities, 62.74 per cent of all aged 5 to 20, school ages. Approximately, of the number aged 10 to 15, nine-tenths in both country and city attend school, but at the ages 15 to 20, two-fifths in the country and one-fourth in the cities attend school. These figures relate solely to the *number* who attend school and the showing for the country is very good. Now consider *time* of attendance. Of the number of children of school ages, 14 per cent in the country and 3 per cent in the cities attend less than five months; 30 per cent in the country and 7 per cent in the cities attend less than eight months; 42 per cent in the country and 11 per cent in the cities attend less than nine months; 20 per cent in the country and 26 per cent in the cities attend nine months, and only 8 per cent in the country and 26 per cent in the cities attend ten months. The average time of attendance in the country is seven months, and in the cities nine months. The average time of attendance in the country is lengthened by the large number of pupils, mostly boys, who attend three of four months in the winter. The country outside the cities includes all villages. Could the statistics of the exclusively farming districts be obtained separate from the village statistics, it would be found that the time of attendance in the farming districts is very short.

ILLITERACY.

The statistics of illiteracy naturally come next in order. The whole number of illiterate persons 10 years of age and over in the State is 95,037. In 1890 the number was 95,914. In 1894 the number who could neither read nor write was 70,772. The number who could read but not write was 24,265. Of the 70,772 who could neither read nor write, 24,660 are native and 46,112 foreign-born. The foreign-born illiterates are unable to read or write their own languages as well as the English language. Of the native inhabitants 21, and of the foreign-born 84, in each one thousand are unable to read or write. In the cities the native inhabitants unable to read or write are 14, and the foreign-born 84, in each one thousand. Outside the cities, the native inhabitants unable to read or write are 24, as compared with 14 in the cities. Of the native males of voting ages, in the State, 28, and of the foreign-born, 92, in each one thousand, are unable to read or write. In the cities the numbers are 18 and 90 respectively, and outside the cities 32 and 93 respectively. In one thousand native voters in the country there are fourteen more unable to read or write than in a like number in the cities.

FARMS.

As this is a farmers' meeting, it certainly is proper to introduce some statistics of the farms. Here are a few facts that will interest you. In the southern four tiers of counties, in the ten years from 1884 to 1894, there was an increase of 3,678 in the whole number of farms. In this same section and period there was a decrease of 2,858 in the number of farms cultivated by owners. All of the central, and all but four of the northern counties show an increase of farms cultivated by owners, but in 23 of the 28 counties in the southern section there is a decrease. In one of the five there is neither gain nor loss, and in four—Berrien, Kent, Monroe and Ottawa—there is an increase. All of these four are fruit and market garden counties. Beginning with 1880, in each one thousand farms in the State, the number cultivated by owners at each census was as follows: 1880, 900; 1884, 880; 1890, 860, and 1894, 838. These figures force the question, why is it that the number of farms now cultivated by owners is less, proportionately, than formerly? The answer is not that farms have been sold on mortgage, or that they have been bought up and enlarged by capitalists. We have not yet reached that point. Rather, that poor men and young men, in these times of low prices, prefer to rent farms to going in debt for them.

A few more facts relating to farms in the southern four tiers of counties. In the 10 years since 1884 the improved land has increased 506,610 acres, yet there is a loss in farm values of $61,690,047, and this loss has occurred in spite of the fact that farms near the larger cities have increased in value. The average loss per acre is $5.71, or more than 12 per cent. But this is not all the loss farmers have suffered. The value of farm implements shows a decrease of $2,963,567, and live stock of $19,961,373. The loss on farms, farm implements and live stock aggregates the immense sum of $84,614,987. Add to this, if you please, the loss upon farm products, that is, the decrease in the value of farm products in 1894 as compared with 1884, $6,217,257, and we have a total loss to the farmers in the southern four tiers of counties of $90,832,244, nearly $91,000,000. You will be interested to know how the wages paid in the two census years compare. The farmers of this section paid in the census year 1894 $1,286,507 less for outdoor labor than for the corresponding year 1884, and for indoor labor, $438,728 less. These figures mean that from six to eight thousand farm laborers, and three or four thousand hired girls, were thrown out of permanent work.

A few comparisons with 1890 will be instructive. According to the census, the farms in the State were worth $27,941,167 less in 1894 than in 1890. The decline in value of farm implements was $1,047,984, and of live stock, $16,414,872, a total depreciation in land, implements and live stock of $45,404,023. Farm products in 1894 were worth $2,380,542 less than in 1890.

THE MICHIGAN WEATHER BUREAU AND ITS WEATHER CROP BULLETIN.

LIEUT. C. F. SCHNEIDER, LANSING.

[Abstract of Lecture.]

The object of the lecture was to outline as briefly and clearly as possible the general organization of the National Weather Bureau and Michigan Weather Service, and to give as good an idea as time permitted of what these organizations were doing, and what they hoped to achieve.

The National Weather Bureau and the location of its stations at the principal large cities throughout the United States, and the instrumental equipment of these stations, was first taken up. The manner of taking simultaneous observations at all these stations, and their rapid collection by a telegraphic cipher system for the daily weather map, was next described. The daily weather map was then taken up and carefully explained by the help of large charts which depicted the two principal kinds of storms, "highs" and "lows." Some time was given to explaining the isobas and isotherms and to the effect that the "highs" and "lows" had upon the weather of any section while moving across it. These atmospheric waves, the crests of which are designated on the map by the word "high" and the troughs or depressions by the word "low" have a general movement from west to east of about 600 miles per day. The "lows" bring cloudy weather and high winds; rain or snow is also associated with the "lows." The "highs" brings clear weather with gentle winds and colder weather. The movement of the air about the center of "low" pressure is spirally inwards and in the direction opposite the movement of the hands of a watch; about a center of "high" pressure, the winds flow outwards and in a direction similar to that of the hands of a watch. By means of the large charts, upon which were shown typical storms of both kinds, these few general rules were plainly shown.

After the daily forecast had been explained, the means employed for its rapid and wide dissemination were then brought out as plainly as possible. Next followed the uses to which the weather forecast is now being put in our large business centers in the transaction of daily business of all kinds; how these forecasts are posted in many of our smaller postoffices for the benefit of the agricultural communities, making such postoffices a reliable source of information regarding the official forecast.

The Michigan Weather Service and its organization was then explained; the principal work of the State Weather Service being its agency in distributing its forecasts; the collection and compilation of meteorological data, especially temperature and precipitation, and the issuance of the weekly crop bulletin during the planting, growing and harvesting seasons. The great value of a good record of temperature and precipitation for every locality in the State was dwelt upon at some length and examples given to show how such data had been used to great advantage. The manner of collecting this data through a corps of voluntary observers was then explained. The State furnishes these observers with the necessary instruments for carrying on their work, the national government furnishes the forms and other stationery, while the observers themselves keep up this daily work of meteorological observations voluntarily and without any remuneration whatever. The great value of the data which these voluntary observers collect has been used in many ways; by the physician, the engineer, the lawyer, and examples of how it was used in these different professions were also given. It was then shown to what uses the farmer could put this same data in forwarding his work.

The crop bulletin of the service was next touched upon. This bulletin is made up from reports of crop correspondents in all sections of this State, and places before the people from week to week the prevailing weather conditions and their effect upon farming operations and crops. To obtain just this kind of intelligence far in advance of the farmer, the speculator has paid a high price, and the farmer, being without the same information, has not been upon an equal footing with the buyer of his farm products. This bulletin is free to all, and places the dealer, the producer and consumer upon an equal footing. As a record from season to season it is also invaluable.

THE LONG INSTITUTE.

A four days' meeting was held at South Haven February 3-7, 1896. The entire time was devoted to phases of fruit growing. The program printed below will indicate the scope of the meeting, and a more complete mention of it will be found in subsequent pages in this bulletin. Space forbids the publication of many of the papers and discussions of this Institute.

STATE FARMERS' INSTITUTE, SOUTH HAVEN, MICHIGAN.

C. W. Garfield, President; C. J. Monroe, Conductor.

Monday, Tuesday, Wednesday, Thursday, and Friday, February 3, 4, 5, 6 and 7, 1896.

PROGRAM.

MONDAY, FEB. 3.

7:30 p. m.

The Long Institute--C. W. Garfield
Cultivation and Care of Brains --R. Morrill

MORNING SESSION.

Tuesday, Feb. 4.

10:00. The Peach—Locating and Planting the Orchard-------------------R. Morrill
11:00. Rainfall and Frosts in the Fruit Belt-----------------------Dr. R. C. Kedzie

AFTERNOON SESSION.

1:00. The Drouth as it affects Michigan Fruit Growers------------Prof. L. R. Taft
2:00. Birds and Horticulture---------------------------------Prof. W. B. Barrows
3:00. Water in the Soil-------------Prof. C. D. Smith and Prof. P. B. Woodworth

EVENING SESSION.

7:30. Experiment Station-----------------------Prof. C. D. Smith and T. T. Lyon
Roads ---Geo. C. Monroe
Discussion--------H. J. Dodge, W. H. Wilcox and others, as time will permit

MORNING SESSION.

Wednesday, Feb. 5.

10:00.	The Peach—Cultivation and Care	R. Morrill
11:00.	The Simpler Chemistry of the Farm	Dr. R. C. Kedzie

AFTERNOON SESSION.

1:00.	Management of Fruit Crops in Dry Seasons	Prof. L. R. Taft
2:00.	Bees and Horticulture	Prof. W. B. Barrows
3:00.	Water in the Soil	Prof. C. D. Smith and Prof. P. B. Woodworth

EVENING SESSION.

7:30.	General School Question	C. B. Charles, A. D. Prentice and other school officers and teachers are requested to take part.

MORNING SESSION.

Thursday, Feb. 6.

10:00.	The Peach—Marketing	R. Morrill
11:00.	Soil Exhaustion	Dr. R. C. Kedzie

AFTERNOON SESSION.

1:00.	Irrigation for Michigan	Prof. L. R. Taft
2:00.	Insects and Horticulture	Prof. W. B. Barrows
3:00.	What Cultivation Does	Prof. C. D. Smith and Prof. P. B. Woodworth

EVENING SESSION.

7:30.	Is it Sunset on the Farm?	J. J. Woodman
	Rural Home Topics	W. H. Millar, Mmes. C. M. Sheffer and J. G. Ramsdell

MORNING SESSION.

Friday, Feb. 7.

10:00.	The Peach—Varieties and Profits	R. Morrill
11:00.	Feeding the Soil	Dr. R. C. Kedzie

AFTERNOON SESSION.

1:00.	Fungicides and their Application	Prof. L. R. Taft
2:00.	Insecticides in Horticulture	Prof. W. B. Barrows
3:00.	What cultivation Does	Prof. C. D. Smith and Prof. P. B. Woodworth

THE PEACH.

ROLAND MORRILL, BENTON HARBOR.

LOCATING AND PLANTING THE ORCHARD.

THE TEN COMMANDMENTS OF PEACH CULTURE.

Mr. J. H. Hale of Connecticut, an authority on peach growing, has laid down ten basic principles for success in peach culture. He calls them the "Ten Commandments of Peach Culture." They are so good and to the point that I will read them. He says, "On these ten commandments hang most of the law and all of the profits:"

(1) High, dry, sandy or sand-loam soil.

(2) Careful selection of varieties most hardy in fruit bud.

(3) Vigorous, healthy seedling stocks, budded from bearing trees of undoubted purity and health.

(4) Trees given entire possession of the land from the start.

(5) Thorough culture from the opening of spring till the new growth is well along.

(6) Liberal annual manuring, broadcast, with commercial manures rich in potash and phosphoric acid and lacking in nitrogen.

(7) Low heading and close annual pruning for the first five years.

(8) Keep out most borers with some suitable wash and dig out all others.

(9) Search for traces of the yellows every week of the growing season, and, at first sign, pull up and burn every infested tree.

(10) Thin the fruit so that there shall never be what is termed a full crop.

These commandments are so good that I have preserved them, and on them I shall talk, because they are so close to my ideas.

The question of climate is hardly worth discussing; it is what it is and we cannot change it. But we have a great variety of soils, and, on the lake shore particularly, some well adapted to peach culture, and some not so well adapted. Therefore, the question of soils is well for us to understand. We have soils ranging from heavy, damp clay, to a fine drifting sand with very little fertility in it. I think either extreme is undesirable, although I would rather go to the very light, poor soil, and build it up with fertilizers than to take clay. Some dry clays do well, but the clays that need underdrainage have not succeeded anywhere nearly so well as those with a thoroughly natural undrained subsoil. It is noticeable that trees grow well on such land, but they do not seem to have the vitality. They become dark and gummy, and blackened, and have dead wood in the center very young. The fruit never seems to obtain proper development, and in cold seasons it often becomes almost an entire failure, judging from a market standpoint. Still there are a great many such orchards and many more being set, but I do not believe that underdrainage can ever compensate for the bad character of that class of soil. There are orchards near South Haven planted on that kind of land, and you know how they succeed. Our understanding of soils is not all alike; perhaps with discussion we can get together and understand it better. The facts are stubborn and we cannot get around them, and facts are what we want to get at.

A poor drifting sand will grow certain varieties of peaches very well. I know of orchards that are in sand so light that it has drifted clear into the tops, and still certain varieties are doing well among those. I have come to think that it requires a soil of good fertility to grow a peach that is first-class in quality, and I think quality means fertility. But we have to use the soil we have. We have to make the best of it, and it is a pretty nice thing to understand what varieties are going to succeed best. I do not know that any man can tell you what is going to succeed on your land. We have got to learn it from our neighbors and our own experience.

THE IDEAL SOIL.

The ideal soil is a sandy loam of good fertility, with a sandy, gravelly, clay sub-soil—a dry mellow clay will do. The root of the peach is very sensitive, and will usually find an excess of moisture in clay that will injure the roots. In 1892 we had trees in soil of that character that were damaged, even pears suffered, and pears will stand much more than peaches. A soil that has never retained moisture so that it will run in streams will maintain good healthy roots, and without it we will never have a good orchard.

THE LOCATION IS ESSENTIAL.

We know that atmospheric drainage is absolutely essential in certain seasons. There are seasons so uniformly good, without extremes, that almost any locality is successful for that year, and farmers are apt to conclude that the seasons have changed and that these undesirable locations are desirable after all. Those people are often doomed to disappointment, for perhaps the very next season new conditions may arise. Consequently the location that is right in all particulars is worth much more money to take our risks of the orchard on than the location that is not quite right. I recollect that people in the vicinity of Fennville had peaches planted on high land, which were all killed, and some on the low land that were all saved. There the conditions that will obtain in nine times out of ten were reversed, and there was a reason for it. During the night in which the frost occurred there was some change in the atmosphere, there being a dense fog. All this was perplexing, but it would never be safe to draw conclusions from that circumstance, because it was an exceptional case. But we understand that under ordinary circumstances cold will run down hill as readily as water, and in that way we should select our orchards. The crops are better in my opinion on hills or slopes than on a high level. A few hours of absolutely quiet atmosphere may destroy peaches. It is the last degree or two that does the mischief. Have that in view well and you will know what to select in the way of a location, if you have it to select. Get as close to the ideal as you can, and if these conditions cannot be fully complied with, you can do something toward it.

IN PLANTING THE ORCHARD,

if the soil was of a tenacious character, I should subsoil it very deeply. I would not apply any manure whatever, but I do like to plow under a clover sod, because it fills the ground up with vegetable mould to work on in after years, and it loads the ground up with nitrogen; I prefer the clover. I would not apply any manure of any description until the trees have begun to bear. After selecting your soil you want to determine the distance at which to plant. I think we do more over-planting on our land than under-planting; I mean that we plant too many trees to get the best results. The time is rapidly coming when none but the best can reach the profitable point in our markets, and we must plant with that in view, giving plenty of room and plenty of feeding ground. Then

THE SELECTION OF THE KIND OF TREES THAT YOU SHALL PLANT

appears to me very important. We see men, when they want to buy trees to set, looking for the cheapest stock. I think that three men out of four in the State of Michigan are asking "who will sell these trees for the least money." Now in nine cases out of ten he will get exactly what he is looking for. There is always somebody who has undesirable stock; it may not be poor, but it may not be the variety that is called for, but it is simply sell cheap or lose. This is the rock on which many a good orchard has been split—the hunt for cheap stock. Now, I would say to every man, economize in every possible way, but first find the very best stock you can, and then buy it as cheaply as possible. Do not hunt for the high priced stock by any means, but hunt for the best stock and take nothing but that. I do not mean great big trees, because it is often the case that they are not the best stock. But choose those that have been grown on good land from good stock. A large portion of our nurserymen bud from nursery stock year after year and continuously. Mr. Hale undoubtedly had this fact in mind when he laid out this rule, that the man who buds that way takes some risk; in the ordinary process of nursery work, in the budding, a mistake has occurred in a little mixing, and if you go on and cut from these trees before they fruit, you do not know really what you have got. Mr. Lyon says that in his test orchard down here a large portion of the trees sent to the Michigan Experimental Station are not true to name. In the pear, the apple and the plum, this difference can be detected readily in the growth or the peculiarity of variety. But there are only a few varieties of peach that one can distinguish from others in the nursery. A man can distinguish the difference between the yellow and the white peach, but he cannot tell you what kind of a yellow peach or a white peach it is. Consequently, if a mistake creeps into a nursery and continues right along, every year it gets worse.

AN INSTANCE.

I was talking once with a foreman of an Illinois nursery and I said to him, "How do you know that your stock is pure?" "Why," he said, "we bought it of men that we supposed to be reliable and we calculate it is pure." I asked him how long he had budded from the same stock. He said ever since he had been foreman, for thirty years. For thirty years they have budded trees and labeled them and sent them out. As a matter of fact where everything is in a row, there may not be half a dozen peaches together bearing the same fruit, and there are many varieties in Michigan that nobody knows anything about. The man who buds from bearing stock sees the fruit on the trees. The man who buds from nursery stock will make the buds live better. The man who buds from bearing stock will lose from twenty-five to fifty per cent, as they cannot always distinguish between the fruit bud and the leaf. The only safety is the double fruit bud, they always have a leaf bud in the center. But those buds are not so sure even then as the nursery bud, and I think that fact influences nursery men a great deal. The losses in nursery are much greater if they do that, but the orchard is much safer. I believe that a tree budded from a bearing tree comes to fruit much quicker. I think I have seen plenty of evidence of this. I saw a number of trees budded this last year from bearing trees six years old, and those trees were full of fruit buds in the nursery. That looked to me as though that was a settled fact that it made a difference. I know an orchard of a thousand trees that was budded from trees three to five years old, that bore 75 baskets at one year old. I know at the same time of trees budded from nursery stock three and four years old not yet in bearing.

GETTING THE TREES HOME.

After selecting trees that are according to your ideas of what they should be, grown on land suitable for growing them, each one firm, hard, and full of vitality, not too large, not too small, the next thing is to get them to your grounds without any injury to the vitality. In my own work I put the trees where I intend to set them in the fall. I do that from choice and heel them at an angle of about 45 degrees and cover with evergreen boughs. I think covering with evergreens is very essential because it prevents a change taking place and evaporating whatever moisture there may be. The trees will come out vigorous and good in the spring, and are right on the ground where you want to set them, the exposure being very slight. A good many men do not see very much in this, but it is these little things that count. When you see a man who has set one, two or three thousand trees, and tells you he has set them without a loss of a single tree, you may know that that man has been careful of every detail from the nursery to the present day. In setting an orchard of peaches, I should not set closer than twenty or twenty-five feet. On dry soils I would set a little deeper than I have in the past. I have always calculated to set as deep as they come out of the nursery, but wherever I find the trees that have been set deeper, where the stock has been trimmed in the nursery, the trees have more vigor, but I think that would only apply on all dry land. There I set a little deeper than where they were budded. I know that that is contrary to the laid-down rules in the book, but I think I have seen reasons enough for saying that I would do so. I like uniformity, and if my trees varied in size, I should assort them and set each size by itself. Then after setting them I should go through and trim as I wanted them to be trimmed, and that would depend a little upon the tree itself. If the tree was one having plenty of buds along the side, I should take off every limb and cut it back to about thirty inches high. Now, if this tree has been a large grower, and you take these side limbs all off, there may not be more than two or three buds left, and there you get a bad formation. Then, if that is the case, cut the limbs off that you would like to make your tops of, select the limb that you would prefer to save, and I presume it is with you as with me, you would like the strong limbs to the west side, and cut off at least two buds so that if one fails the other will come, and then after they are started, rub off the surplus, and do not wait until they are large enough to cut off with a knife. We often find a tree started with a poor top because of a little neglect.

Along the shore it is necessary to watch your orchard because cut-worms are so plentiful. By applying a band of sheep wool around the body of the tree a cut worm will not get up there. It is always a good and safe prevention.

DISCUSSION.

Mr. Lovejoy: In heeling in peach trees in the fall, would you then trim the roots, if they need it, in preference to the time of setting?

Mr. Morrill: Yes sir, preferably, because they will form a proper callous.

Mr. Cook: Does the yellow peach do any better on heavy soil, and is it a good idea to let the young trees, which you spoke of, bear a full crop?

Mr. Morrill: I do not advocate it at all, and as for the yellow peaches doing better on heavy soil than on light, I cannot say as to that. I notice in this drifting sand that I speak of that the white peaches seem to do best.

Q: You speak of Mr. Hale being authority in Connecticut; he plants his trees only twelve and thirteen feet apart. Now does that apply to Connecticut, or is it something peculiar?

Mr. Morrill: I believe it applies to Hale. I do not think he is right in that. I know it would not be right on my place. The place where he has drawn his conclusions from is largely Georgia. But Mr. Hale is a trained, careful man, who has cultivated his brains at every opportunity, and I do not know why he has made that statement, because it is contrary to every northern State that I have been in, but may be good in the south.

Mr. Anvil: Prof. ———— says in one of his treatises that low trees are an abomination. I would like to know if you agree with him as to the height of starting trees.

Mr. Morrill: I do not know what he means by low trees. In California what they would call a low tree would be much lower than we call a low tree. I like eighteen to twenty-four inches of clean body, and this is based on my observation and experience. To have them higher allows a little more opportunity for culture, but it causes lots of extra labor in picking, pruning, etc. If I can have eighteen inches of clean body that is all I want.

Mr. Voorheis: I do not know as I understand you in regard to rubbing off the buds, the first year as often as they leave out, and starting out little branches all along up the top; and I want to inquire whether it is best to keep everything all rubbed off except the branches that you want to grow and develop.

Mr. Morrill: I have heard it stated by men that know more than I that they prefer at least to start the bud, but I have made the practice of selecting along in June the branches I want.

Mr. Tucker: Is it always necessary to prune the roots of young trees before they are set?

Mr. Morrill: A good deal depends upon when they have been taken up. Still I know that men who are old in the business prefer to have a clean, nice cut on them. I always cut all ragged roots. There is something now that a few people are experimenting on, and I do not know what there is in it, of cutting nearly all the roots. I saw samples of trees that had been set one year and two years and taken up; they were trimmed right to a spike, and they certainly had a better root system. There may be something in it, but we have tried to get all the roots we can. It never looks quite right to me, but they showed plenty of evidence that they were right.

Q: If we have failed to prune the roots of the trees in the fall, would you rather prune them in the spring than not at all?

Mr. Morrill: Yes, if they are broken and ragged.

Mr. Burton: Do you think it makes a difference about the land? If our land is not very good it would not start them so well. Do you advocate planting for that and then set them sixteen feet the other way? That sometimes breaks the wind.

Mr. Morrill: Regarding what you say about close trimming of roots, I do not advocate that at all; I like all the good roots I can get just as you do. But I have seen some things that make me think perhaps that is not right. The best thing a man ever took into an orchard is plenty of brains and good judgment.

Q: Is it necessary to cut the nursery buds the next fall and cut the bearing tree the year before on account of the buds taking so much better out of the nursery stock?

Mr. Morrill: They just bud what they intend for the next season, because there is so much greater loss. I have advocated that the trees should be budded and bearing at least one or two years before that. Other varieties I budded before, and have done so year after year, and that is the reason I think they should not go too long from the original bearing tree. I am quite fully convinced that it is one of the secrets of getting a successful orchard, but it is an idea that will be combatted by nurserymen.

Q: In connection with the preparing of the soil, you think you would like to turn under a clover sod. What do you do when you prepare an ideal bed for your peach orchard more than to plow under that clover sod?

Mr. Morrill: If it was a retentive soil I should prepare it very deeply, if a mellow soil about the ordinary depth of running a plow, just as I would fit it for my corn or potatoes, remembering that that is the last thorough fitting that land would get.

Q: Would you plow that clover sod under deep?

Mr. Morrill: Yes, sir; I would not subsoil on ideal peach land, because the bottom of an ideal peach farm is mellow clay loam.

Mr. Palmer: I think you stated you would not use a fertilizer in setting out peach trees until they got to bearing. It seems to me it might be well to make some exceptions. We set out trees on poor soil, for the sand on the lake shore is pretty poor, and it seems to me it might be well to use a fertilizer. Would not it be well to make that an exception?

Mr. Morrill: There are places where I would do that. There are exceptions to all rules. I spoke principally of a general rule, on land well adapted to peaches. I would certainly on some lands use some fertilizers. This is for growing the tree while it is young.

Mr. Garfield: Will you tell what is your ideal peach tree as taken from the nursery that you would like to buy?

Mr. Morrill: The ideal tree for me would be a tree that has made a growth of from four to five and a half feet, neatly branched, stocky, sound and ripe, with a good root evenly distributed around the different sides. That would be my ideal tree. At the same time I secure the varieties I want.

Prof. Taft: What do you think of June buds?

Mr. Morrill: I am a little afraid of June budded trees. They have not generally been successful around us. We have tried them and I think they do not mature as well as trees grown in our own country.

Q: Will trimming close weaken the vitality of the tree at time to set?

Mr. Morrill: I do not think it does; I never saw any bad effects from it. I think the thing that would injure it would be to leave too much wood. The plan I detailed this morning was maintaining proper bounds. That is a thing which a man must be able to judge for himself when he steps up to the individual tree. The principal idea that I tried to get into this is to have an ideal from the first and work to it, not wait until it is two or three years old and then get it right.

CULTIVATION AND CARE.

I will go back a little on yesterday's work, because there was a very important part that I left out purposely, hoping that it would be called up, but it was not, and that is the very early setting of trees to get a splendid start the first year. I consider it absolutely necessary that it should be the first job done in the spring as soon as the ground settles. Never put it off to get your oats planted because they are annual crops. With an imperfect start you never can have a perfect orchard, and early setting is very essential. Never allow trees to make a start before they are set in the ground. Move them to the place they are to stand as soon as you can. An orchard which does not get started until June is in a very poor condition to get ready for winter, while one that starts with the first flow of sap will stand a great deal more. Oftentimes an orchard is partially killed through a little inattention to this particular part. The winter catches it in a tender condition and injures it to that extent that before it has half lived its usefulness, it is rotten at the heart. One of the most frequent causes of this injury is immature wood.

CROPS IN THE ORCHARD.

The matter of cultivation of the soil I consider a very important one. The first year after setting the peach orchard, I would grow some crop on it; but there is a difference in crops. A crop planted early to mature in August or July, and make its heavy draft on the soil for moisture at that time, is objectionable; it is too early to ripen the peach, because by taking the water out of the soil at that time you will make them form terminals, and usually about the first of September we get rains, and warm weather, and they will start again, and that leaves them in a very bad shape because they never can mature before winter. I would not plant early potatoes in the orchard, and I do not consider them a very good crop in an orchard any way, because the digging may start a little sap, which you do not want to do. But if I planted any potatoes in an orchard, they would be late ones. I prefer corn to potatoes. We find with us that a crop of melons is really the best, but melons are not grown everywhere. Many people over the State go at it with an apparent deliberate intent to crop their orchards out before they come into bearing. Now this is a sad mistake. We should remember that the orchard is the prime crop for that land, that is what we are expecting our money from. I have practiced growing two crops in the orchard by using fertilizers of some character that would compensate for what I would take out, by trying to have my land in condition before setting. In the future I think I shall never grow but one crop and then turn the land over to the orchard. My own experience and observation lead me to believe that I know five dollars can come out of it where you can never get one by the other method.

CULTIVATING WITH NO CROP.

The cultivation of an orchard that has no crop in it is a very cheap affair. You can cultivate it with two horses and it is very rapid work, but there are very few good cultivators. But that cultivation must be of a character that must drive the tree just as hard as possible the first three months; and the next essential point is to use the next three months to ripen the wood perfectly. If you can do that you have the ideal condition, and then you have a sound growth and one that will furnish you lots of fruit and set out good strong buds. Remember that the bud formation takes place in July and August, and without a good crop of buds it is almost impossible to get a crop of good peaches. The foundation of your next crop of peaches is certainly laid this year. As you have noticed, an orchard that overbears this year seldom furnishes you a real nice crop next year, simply because it could only mature what it had and could not lay a foundation for the next year. For the first year I do not know how deep you should cultivate; for the second year I would not cultivate very close to the tree. For the third and fourth years, and from then on, I never cultivate an orchard deeply. Sometimes I see men plowing four, five or six inches deep, and it looks to me as if they were going to ruin that year's crop, and they usually do. We see men plowing in the spring so deep down that they are turning up roots as large as your finger sometimes, and it certainly must result in injury. For that reason I say always work shallow after the first one or two years at the outside.

I spoke yesterday of thorough fitting of the land so that it would be fitted in good shape down to a good depth, and that would be simply a part of the plan. I had an idea, and I felt that I was very safe in it, that very early plowing started the growth a little too soon, the conditions being such that you got a rapid growth and curl leaf was caused. That theory is a little bit shaky with me now, so I am beginning to give the idea up and think that I do not know very much about it. I have heard it suggested that the conditions were not good for curl leaf the 20th of last May, that the growth had been moderate previous to that, but while they had it in the southern belt, in the northern part the conditions were ideal. The foliage was very young and tender, but still there was no curl. Our scientific men tell us it is a disease contagious and can be controlled by Bordeaux mixture, and it begins to look as if that was right. Early cultivation may have just this one bad effect, it may break up the capillary action and make it more liable to frosts. If you want to commence I should wait until the frosty spell is over and then commence and hurry my work along. A little attention to a few things like that will often save you a few hundred dollars.

PRUNING.

When a tree has been set, my practice has been to keep rubbed off the superfluous shoots for the first season. Rub off the unnecessary ones in the top and the top formation will be distributed twelve or fourteen inches along the top so that there will be no crotches formed. Have an ideal in your mind, remembering that a few limbs do not show very much on a tree now, but as they get older they show considerably, and leave not more than you need, although on the peach you can cut out much better than on the apple. After one year's growth I trim back the strong growth to balance them up with the weaker ones. You usually find the weaker growth on the west side. Cutting back the stronger growth wherever it appears is my practice for the first year. After that I cut back one-half to two-thirds of the annual growth. Always commence the cutting from the top and then work down the limb; never commence at the bottom and work up. There have been never half a dozen crops in my orchard of eight years old, that has borne crops that have had to be thinned.

There are two trying periods in the life of the bearing peach tree—one when it is forming pits, and one the period of blooming. The production of pollen is a severe draft on the tree. To illustrate that, an apple orchard often blooms until it is a solid bank, and bye and bye it all sheds off; it exhausts itself from an overabundance of blossoms. With a little scattering bloom you often get a nice crop of fruit. To prevent that in the peach, we would trim off all this surplus wood before blooming. Now I have advocated cutting back severely and thinning out the following year, but my friend, Mr. Graham, of Grand Rapids, at several institutes this winter, has cautioned the people that my practice might not be good for them. He said, "It may do for Morrill, or for Stearns, but it may not do at all for you." Now that is true, because he bases his calculations on this, that a large majority of the people are not quite thorough enough. Now, unless the whole plan is carried out, I am not sure but that it had not better be attempted. The practice just half performed might result in damage. For that reason I shall take Mr. Graham's caution and throw it out here myself.

THINNING.

The next important operation with a good crop of fruit is to thin it, and as I said the other day, there is such a thing as doing the right thing at the wrong time or the wrong thing at the right time; this pruning, if put off to late, may be the right thing in the wrong time. If you wait till the pit formation has commenced, there is another draft on your tree. Many of you wait until the pit hardens and the thinning does not increase the size of your fruit much. The framework of that peach has been laid out, and it would not make so very much difference how many peaches there are on that tree, but if taken off before this occurs, your framework will be laid out larger, and the probability is that you will take three or four times the dollars out of the crop because you have fine fruit all through.

I want now to refer again to Mr. Hale's commandments. His fifth commandment is, "Give thorough culture from the opening of spring until the new growth is well along." I take this view of it, that the first year, on account of the late start, they do need a check. If they had entire possession of the land the first year, and good culture, it would be a question in my mind if they would mature properly.

MANURING.

Mr. Hale advises "liberal annual manuring broadcast, with commercial fertilizers rich in potash and phosphoric acid, and lacking in nitrogen." Now with me that is the very best possible practice; I have used ashes that I was satisfied in my crop were worth $50 a ton. Prof. Bailey's estimate was three or four times that. He came over from the world's fair and particularly wanted to see a block I had of three hundred trees that were loaded. They all set fruit, but within a week or two before the time of ripening, I noticed that the three rows that had not had any potash were not filling out and getting that nice swell in them that you like to see, and were not coming out so well as where the ashes were.

Prof. Bailey wanted to know when they were ripe, and he came over on Saturday and we drove up to the orchard Sunday. The night before there came up a terrible thunder shower and a big blow. We went up to the orchard and when we went in three-fourths of my ripe peaches were on the ground. On the three rows the ground was simply paved with peaches. There were not half a dozen peaches on the ground where the ashes were. There those peaches hung right through that storm, and when we commenced picking that day there was quite a contrast in the baskets. That has followed right straight through wherever I have applied ashes. But it is possible that your soil is already rich in potash. Mine is not. Ashes and bone combined give me wonderful results. As Prof. Bailey said, "Ashes are worth $150 a ton here." I would not put barnyard manure in a peach orchard on any conditions if it was on soil good for anything. There is such a thing as having land too rich if it is of a naturally rich character. Where we get the largest growth of trees we do not always get the finest fruit.

Hale again: "Low heading and close annual pruning for the first five years." This low pruning where you are going to do so much work in the tree is a great labor saving. My thinning and pruning this last year took seventeen and one-half days per acre. That is a good deal of work. Many men say that they cannot afford to do it, but I cannot afford to not do it.

KEEPING OUT THE BORERS.

Mr. Hale says, "Keep out most borers with some suitable wash, and dig out all others." That is good; the man who goes to washing peach trees wants to know what he is doing. The country is full of monuments of people's ignorance on this particular point. Mr. Hale is as good authority on peach matters as there is in the United States. A few years ago he published a formula for this wash. The formula is all right no doubt and he used it successfully; but some of my neighbors, having very fine orchards, were troubled with borers. Knowing that Mr. Hale was safe authority, they washed their trees and killed them. They took it off, but it was too late, the trees were killed. The men wrote him and asked him if there was any mistake made in the formula, and he said no and that he had used it for years. They sent to Chicago and got pure potash and pure carbolic acid. This seemed to be the mistake, for he had used the crude carbolic acid. That's why I say when you talk about washing a tree that I want every man to think a little before he does it. The peach bark is delicate in many ways. I do not use any wash; I can keep the borers off by mounding up in the fall and leaving it there until about the next July, and then hoe it away, and if the borer has made any start take it out. We know that does not do any damage. It prevents his hatching around the crown of your tree. For that reason I would not take his eighth commandment; but I should surely keep the borer out. I hunt two or three times a year because I do not like to have them get in the trees.

THE YELLOWS.

South Haven is entitled to the credit of first practicing Mr. Hale's ninth commandment to pull up and burn every tree infested with yellows. The people of South Haven were the first men to tell us we could set another tree back in that place and grow it. In our vicinity we were ignorant of the yellows. You people here profited by the experience of our county and Allegan. But there is now more or less negligence even in this vicinity. I do not think that yellows trees are taken out promptly enough by some people. I do not know just at what time a tree gives off contagion to the next tree, but when taken out immediately and burned there is no further contagion. That would indicate that you cannot afford to take a moment's risk; consequently, the only safe way is to do exactly as he says, "at the first sign pull up and burn." Then if your orchard is not too old you can set another tree there next spring, with perfect safety so far as the yellows are concerned.

There is something that is worth mentioning here in connection with the yellows. About a year ago one of the Wilson brothers at St. Joseph came to me and said, "Do you believe that Bordeaux mixture will prevent yellows in the peach trees?" I said, "No, I do not." He says, "I do." "What makes you believe it?" He told me that three or four years ago he began spraying with Bordeaux mixture to prevent rotting because some of our Agricultural College professors had given him the idea that it would prevent peach rot. They had been having a little yellows in the orchard, and he said from that day to this they had never had a tree. "We have one other neighbor that does the same thing. He has not had a tree diseased. We dose them the same time we do our grapes. We keep them painted right straight through." It was a new proposition to me, for I knew that our chemical experts say they have not been able to get favorable results. At the Fennville Institute a few days ago, half a dozen men said that when they had begun spraying with Bordeaux they noticed a decrease in yellows. That seemed a little corroborative, and since then I have questioned every man that was in the habit of spraying peach trees, and I find that a number of men have that idea and think there may be something in it. The evidence certainly looks that way. The Bordeaux treatment is certainly all right for curl leaf, wherever they have gone at it according to the Experiment Station bulletins, and it may be a wonderful check on yellows.

THINNING AGAIN.

It takes a good deal of nerve to thin the peaches down right. We go in and take off peaches until they are four inches apart, and they look pretty for apart. But the next year it takes a good deal more nerve to go into it again. So it becomes a very difficult matter to thin down right, but those who have done this have the most money to show for their crops. Keep them so far apart that you cannot touch one peach with your finger and the other with the thumb. It is pretty hard to do it, but it is absolutely essential that it should be done.

DISCUSSION.

Mr. Hall: What do you think about fall plowing before spring setting?

Mr. Morrill: I like to fall plow on land that won't run down, and really that is not the best peach land; but on land that is adapted to peaches I like to do it, but would replow it in the spring.

Mr. Hall: About five years ago I had my first experience. I undertook to plow some land for my trees to set them in the spring, and winter shut me off; and when I came to set my trees in the spring, I did it very early, and as my trees grew I could go at any time for three or four years afterward and tell where the fall plowing commenced and where the spring plowing was done. There seemed to be a year's growth betweeen the trees, so that I always fall plowed when I could for spring setting since.

Mr. Mackay: After the orchard is five years old I would not fall plow. I have an orchard and have 400 trees to set in it this next spring. We take out the broken, poor and imperfect trees every year, and we have new ones to set in every spring. If I am wrong I would like to know the reason why.

Mr. Morrill: How far apart are your trees?

Mr. Mackay: Eighteen feet one way and twenty the other. I think that I can keep that orchard young right along.

Mr. Morrill: Well, if you have got to set in as high as 400 trees next year, of course your orchard is getting pretty thin.

Mr. Mackay: Last year I shipped over 20,000 baskets. They seem to grow all right.

Mr. Morrill: My experience in my own orchard is that the trees after they are four or five years old are occupying all the ground. My trees usually bear, from four to five years old, four or five bushels. They are set 16 by 18 feet. I am setting everything now 20 by 20 feet. Where I thin the best I get the biggest yields.

Mr. ————: If we do not renew every year, if we let it run promiscuously, we would pretty soon have a dilapitated orchard. That is my experience.

Mr. Morrill: Why would your orchard be poor and dilapitated?

Mr. ————: I would not have many trees. Every year I have to set in from three to four hundred trees. The wind takes out in the fall, and they get broken down. When a tree gets lop-sided we pull it out and put in a new one. We think we can get more money out of a new tree than we can by trying to doctor up an old one.

Mr. Morrill: I would think perhaps there was something faulty that leaves it at that age dilapitated and getting out of order, something perhaps in the pruning or care. I have an orchard eight years old that has borne me five as heavy crops as any in the State, and it is in the pink of condition today. It has been treated exactly as I recommend, and the ground is all occoupied.

Mr. ————: My orchard is on the lake shore and I do not think there has been any fault in the cultivation. It is not very highly pruned, but moderately so; we have taken good care of it. perhaps as good care as the average orchard in this country, and I think there are other people that grow largely that have adopted the same system.

Mr. Bixby: Mr. Morrill told us that wood growth was damaging to fruit growth. I never saw fine large peaches that had not made good wood growth the year before.

Mr. Morrill: Mr. Bixby I think has not observed what I have said very closely. I said that it frequently occurs on certain soils that good wood growth does not produce the finest peaches. There are conditions there that make good wood growth. Does any man find that heavy rich clays are better than a good rich gravel? If he does, he finds what we do not find with us.

Mr. ————: You can get a good wood growth on clay soil.

Mr. Morrill: We get the best growth there, but not the best peaches.

Mr. Bixby: Would you top plow hilly or sandy soil in the fall?

Mr. Morrill: What you perhaps have in your mind is the difficulty that in fall plowing they are swept with the winds and are damaged. My land does not wash. That is one condition you have that I have not got. But it will not wash nearly so bad if a clover sod is turned under. If it was a clay of a character that did not wash or run badly, I would do it.

Mr. ————: In pruning you cut a good deal off, almost all of last year's growth. That is another thing that we do not do.

Mr. Morrill: From one-half to two-thirds is not almost all. My growth is from 2½ to 4 feet.

Mr. ————: What we try to do is to keep as much of the last year's growth as we can and cut off something old.

Mr. Morrill: We always cut out anything that is of no consequence. My suggestion was this: We commence with a ladder and cut back from one-half to two-thirds, then we commence and go down the limb and thin out until it is quite thin, saying only live wood of course. We get our peaches only on last year's wood. When we get through there is nothing on that tree but that is going to do some good. That cutting off this year throws out a number of growths for next year.

MARKETING.

This subject of marketing is one of the most important, and it is with a good many of us a tender subject because some things must be said that are not always pleasant; I have pretty nearly gotten into trouble saying things that I knew to be true. But I think we must look the matter in the face squarely and it will be of interest to do so.

Some people always think the commission men steal everything and rob us of what we have gained in the past years. Well, if we go on feeling like a lot of abused people we will not find the necessity of rectifying. Consequently whatever I may say will be in good part and with an intention to do good as I understand it, and if I make a mistake recollect that I am perfectly willing to be criticised, and there will be no feeling on my part; if I make a statement that does not apply here, I shall be very glad to hear it.

THE SUCCESSFUL FRUIT GROWER.

A man today must be somewhat different from what he needed to be ten or twenty years ago to make a success in fruit growing. He must be a better and smarter man. A man to make a very successful fruit grower must be coversant with soils, a little bit of a chemist, somewhat of an entomologist, and above all I would say a good salesman. Now, among farmers we do not expect to find good salesmen, but we do occasionally find them. When you have lifted the price five or ten cents on a package by any means in your power, the large proportion of that is profit, but until you passed the fixed charges there was nothing for you. One of the fixed charges is the cost of production. That you have control of and you may reduce. A basket may cost you to produce it, hanging upon the tree or in the baskets, ten or fifteen cents, or it may only cost you five. What it costs depends upon your own skill in growing. The details that we have tried to bring out in the past two days have been looking toward reducing this cost. Many things I have said look like expensive methods, but in my experience and others that I know the most expensive methods are often economical because they produce good fruit for less money. We all know that if you feed an animal it requires a certain amount of food to maintain life. When you add to that you begin to get gain, and there is a point somewhere where you begin to get profit. Just so in growing fruit; there is a certain amount of work that will give you maximum results, either in quality or yield. To stop less than that you may get less than expenses. If you go too far from it, then the cost increases, and there is a right and wrong place to stop with these things, but the majority stop rather under than over the profitable point of production. Those things we have tried to make plain, but have not had time to go into detail.

Now, after producing a good crop comes the question of marketing, and that has probably puzzled farmers more than anything else. It would seem there ought to be a way to market our produce as others do theirs. In fruit growing efforts have been made looking toward coöperative selling, but I do not know of any success yet. Grand Rapids has come the nearest to it, and I guess they are in a fair way to do a good business. In fact they have done the best business last year in Michigan.

NOW, WHY CAN WE NOT DO THESE THINGS?

Farmers are as honest as other people, but perhaps no more so. There are some slick rascals, and if the farmer is a rascal he is not as slick about it; and perhaps they know better what their neighbors are than anybody can tell them, and it seems immediately upon an attempt to organize there is a distrust creeps in, and some men will want to crowd an undersized package in, and an inferior lot of fruit in, and somebody kicks; he wants to get the advantage of his neighbor just for the sake of getting advantage sometimes.

HOW NOT TO DO IT.

I recollect an instance in this State where a good, strong company was formed and incorporated under the law, and forty-five good men along the Lake Shore agreed to do business straight for one year. The first meeting they had it was resolved that they use a uniform quart, full dry quart, for their small fruit. Forty-five men signed their names to that agreement, giving number of cubic inches, everything right, and it seemed to be a real honest spasm they had; a manufacturer made 10,000 packages and just two men took out of those packages for two years. That same organization sent a committee to a steamboat company—there was competition in steamboating at that time—and said "The president of this company would like to make arrangement for the reduction of freights, and we can deliver you a good lot of goods (they had the names of about seventy men) for the balance of the season." They had a pretty nice list made out. The steamboat man asked what rate he ought to give, and said, "If I guarantee you that rate, will you guarantee me that fruit?" He made that right, but he told them the rate would be for everybody; he said, "You represent the fruit growing interest of this section, you have the best men in it, and you ought to let other men share in it." The rate was made. A competing steamboat made it one better, and the chairman of that committee hauled his fruit to that competing steamboat and hauled it there for the rest of the season. If there was a band of thieves in this town they would combine until they had picked you of everything they could carry off, but they would be true to one another as long as there was a dollar in sight. And here is a lot of respectable farmers, men that are as honest as most men today—men that mean to do right, and they go into a scheme of that character and agree to do these things; why can not they hold together as well as a band of thieves? It is a fact we can not, and there is something wrong in it. Now, is it in our training, or in our isolated methods of doing business? I do not know, but I know this, if good shrewd business men join together they usually hang together until they have given the thing a fair trial; and it seems to me that for the small fruit grower it is the only way out. When a man puts up an article not just as he would like to buy it, I believe he knows what he is doing every time, and I believe it is the best indicator to a man of what he should do; but when a man puts up something just as he would not like to buy it, he is paving his way to go down with a mass who must be trampled out if this increase production of fruit goes on. We see it gradually going down a little tighter and tighter, but the best man stays on top. You may say what you please about him, but you will generally find he is looking out for the other fellow's money by fair means. He is studying to obtain that man's money by increasing his desire for his particular fruit.

YOU CAN'T MARKET POOR FRUIT.

Now, I can not tell any man how to market poor fruit successfully, except that there be nothing else in sight and only a limited amount of it. Now, we know there is always enough of it. I do not think that any man can always have the best, but if he has done his work well, he ought to have some pretty good fruit, and most of us can have it much better than we do; but he can put it up so that it is just as it appears to be. Now, if there is no deception, the buyer is satisfied because it is as he thinks it is. The money is of less account to them than the fine fruit is, and they will pay for it. But that is by no means the largest trade of the city. There is another class that wants a fairly good fruit that their purse can reach. If they buy fruit that is as good clear down through as it is on top, they are pretty well satisfied and will feed their appetite as long as it lasts. There is a feeling in all of us against being swindled, and we despise the man who swindles us. Men will argue that a little gain on one basket amounts to a good deal on ten thousand; that they cannot afford to throw away the inferior fruit; that buyers say they expect the best to be on top; but who is responsible for that expectation? They have come to expect it, and to find a man who does not they will go a good ways sometimes. The peach trade has become an enormous one, and unfortunately it is not being well distributed, nearly as well as it should be. Many are over-supplied while many are not supplied. You ship to many points east; you have made a start in the right direction; there are points south and east, not yet supplied. Every car load relieved the western market just that much. Grand Rapids shipped from five to eighteen thousand bushels a day during the season and they almost always went to places out of our own market. They secured good facilities so that they are giving uniform service everywhere. Those people pick in bushel baskets, haul them to the car and take their money and go home. The buyers attend to the distributing. The baskets are uncovered and you can look them over, and they are picked as they run off of the tree; there is no packing house work with it, and they are handled in just that manner; but certain growers could not resist the temptation to get the little fellows in the bottom, though the majority of them did much better. But they do not anywhere nearly supply the whole market. We must get together in this matter and the winter is the time to do it; that is one feature of our business which is very unfortunate. We perhaps come here today and listen to what is said. I think you will all agree with me that that is the best method to pursue, but will you go at it and attempt anything before the peaches are ripe? If by any means you look up these markets, know where they are in advance, you are much better prepared to take advantage of them. That is another means of securing better markets.

INDIVIDUAL MARKETING.

There is another plan left open in case all others fail, and that is a determination to make a trade for yourself. It is no use for any man to say "I can not do this thing," but your fruit has got to stand in one place long enough to be known. You can not ship one day to one man and the next to another or half a dozen. Do not believe that every commission man is a thief under the best conditions. They may be under certain conditions, but they are not fools, whatever you may think of them. If you have ten thousand baskets of peaches coming and the commission man knows or believes you are going to put those ten thousand baskets up right, and that he is going to have all of them, he is not going to steal from you. You had better not quarrel with him about that; let him make some money, but ask him to make you some. No matter what the commission man says, the buyer has come to the point that he will not believe a thing until he knows it. Do not think you can fool a man on South Water street. When he has bought a grower's stock three or four or half a dozen times and it is all right, he is going to see if he can find it when he wants more, and he is willing to pay the difference; he finds more satisfaction and commission in handling it and he is not going to steal if he has a little bit of sense, and many of them have a good deal. An individual who has fruit enough to create any attention and remains still on the market, and in the hands of a good commission man can build up a reputation and let the others do as they please. In doing coöperative work it may be well to pay a man to hunt up markets for you; you had better do this than to lose a lot of money next summer. But, as I said before, probably the best way out of it is by individual reputation. But whatever we do, instead of attempting to remedy evils that are out of our reach, turn the searchlight on and see if we are doing everything just as well as we know how. I would do everything I could to remedy the evil at the other end of the route, but first let us see if we are doing our work the very best we know how.

DISCUSSION.

Mr. Bryant: Can we all avail ourselves of this good packing? A man says "if you have enough to attract any attention under the present system of selling fruit," and a large quantity of fruit—a man of forty acres I have found in the few years back that he does not get satisfactory pay a good deal of the time for straight packing; when the fruit is rather scarce he does, but when there is an abundance of it it seems to be all swallowed up in a great mass. Now, I have been shipping for years to a house that Mr. Morrill favored, and I find that when fruit is scarce the quality of the fruit seems to be appreciated, but when the market is overcrowded, it seems to go along with the rest; and it is quite discouraging. And now, as to gaining reputation, I am shipping plums; two years ago I shipped an order for several houses, and last year I thought I would have the same place to ship to. I find that two of these men had failed, and the other wrote to me that they would not allow him to sell—and there I lost my reputation.

Mr. Hall: I think that Mr. Morrill bore on rather heavy in regard to saying he thought over half of the fruit growers in Michigan were dishonest in their work, and I should hate to feel of the people of South Haven or in the vicinity of South Haven that half of them were defrauding the people. I do not think it is quite as heavy as that, although I think if we would all, when marketing our fruit, go to work and put up a nice basket and put our name on it, it would be better. When we put up some we say we do not want our name on them. I think if we put our name on all packages, and if they are all right, the men that bought them last year will say they will buy them this year. If every man would stamp his own name on every basket, then there would be no difficulty in the little ones in the center and covered up with the big ones. Every man would have to shoulder his own blame. And if we would have a law passed to this effect, it would be of benefit.

Mr. Lawton: I think that the fruit interests are becoming of such proprotions along the lake shore that this coöperative selling is in the right direction. In Lawton we formed a coöperative selling and had a president, secretary, and board, and employed a man to do the selling. We had cars from the Michigan Central railroad; there was a certain amount agreed upon, and we sold our fruit very largely that year in that way. The fruit was deposited in the name of the association, and every basket was stamped. It was largely grapes, and every basket was to contain nine pounds or five pounds, and all to be of good quality. The inspector examined each package to see that they came up to the standard, so that the packages were all certified to and of a uniform weight, nine and five pounds. And we shipped very largely that way that year. Of course there were others who did not belong to the association and they came out just about the same. Parties who sent in the usual manner realized just about the same as the shippers did who sent through the association. We thought we were going to make a great deal more, but we did not. There were some losses; some car loads were sent to different localities and we failed to get back just the prices we had bargained for. Still I think that something of this kind after all is the proper way to dispose of the fruit. But our experience last year did not seem to substantiate that it was of any advantage.

Mr. Delenere: I am not a fruit grower. I do not understand the soil, but am largely interested in marketing the fruit. I find that in the vast regions of the northwest there is a market for every basket that we can produce. I find secondly, that we on the lake shore have to be governed by the prices of the Chicago market. I find again that every car load that can be removed from Chicago reduces the bounty received there and advanced the price and our people get the benefit. I find again that people are willing to come here and buy and pay spot cash for the goods, if they can get honest packing. We want a uniform package, packed by honest people with the same kind of fruit throughout the baskets; if they are select, let them be that; or if they are seconds, let them be that, and you can build up a market as there is a demand for your fruit, and I do not care if you double your acreage, the demand is here in the northwest. In place of shipping 150 cars from South Haven, I think I am justified in saying that, if the fruit is up to the mark, I can place 300. I want it to go forth that the people of South Haven stand up for honest packages, honest weight, straight goods, and that you mean to set the example here to the growers along the lake shore.

Mr. Hart: I think I can name enough houses that would take every basket of peaches that is shipped from this town, and make them net you 35 cents a basket. I was making the figures last fall, and I have been on the road from the northwest for several years, and am acquainted as far as Helena, Mont., to St. Paul, and on most of the roads I know that the prices would net you 35 cents a basket here on leaving South Haven if handled rightly. Have a committee of three or four men that understood the business thoroughly, go through the west and north and look up markets, and they could sell every basket of good honest fruit without any trouble and without any loss to the fruit man. On the Northern

Pacific railroad I could show you cities of 7,000 people that were retailing your pears, that you could not give away here, at not less than ten cents apiece, and they were paying large prices for the baskets. By entering into an arrangement with certain commission men, the men whom they are going to consign to, and the man who will actually give the difference between good and poor fruit, then you can secure a good result. It is not altogether the fault of the fruit growers that fruit does not sell in Chicago. The fruit, after arriving in Chicago, goes through men that are more cunning and more subtle than the farmers. It is packed there, and the farmer is not responsible for the price or the quality of the fruit sold there.

Mr. Ramsdell: To my mind the key note of this whole matter of marketing fruit is this, and in proof of it I would say that there was a committee of three appointed three years ago, maybe four, to see what could be done by forming an organization to do this business of distributing fruit ourselves. That committee worked faithfully, not days altogether but nights and close into the Sunday, in order to see what could be done with the assistance of those who were willing to do it. We had all the constitutions and by-laws and everything of that kind in the way of organizations that were trying to do this same thing, noticing the successes and tremendous failures, but we still went on and worked and called fourteen meetings in one winter, and there were very sensible remarks from almost all the fruit growers that attended the meetings; and in fact, we thought we had the matter pretty nearly in such shape that we could organize and that it was progressing. The committee thought so at any rate, and some others thought so, and finally when it came time for spring's work and no more meetings could be held to any advantage, we called a mass meeting to finish up this thing and see if we could organize, and we had everything that was really agreed to in the meeting before us. After talking about packing fruit, and almost using oaths, some men did, in regard to the rascality of the commission men and the wonderful honesty of the packers this side of the lake, the result was just this: When we said on these articles of association that every man that packed his fruit should have it as good all through as it was on top, and then put his name on it and the name of the association, we got just seventeen men out of one hundred and seventy men to sign; and that is the whole thing we have done. The fact is, nothing can be done in this business. I say this that you may do everything that you can do, that has been named to do, and when you have done all, if the fruit packers that raise the fruit do not pack it as it should be and honestly, you can do nothing. The reputation of this place suffers every year. Now, I say if there was a combination in this matter that has good fruit honestly packed, then we can get rates on the railroads and by express to send it where they please. The trouble has been they sent all that fruit to Chicago.

VARIETIES AND PROFITS.

In the matter of varieties, I presume that every peach grower on the lake shore will agree with me that there have been about as many mistakes made in that as anything we have ever done. Many of these questions are questions of locality. Now, I am talking to you about things thirty miles from here. It may not apply here. Another thing is the question of soil. Certain varieties are adapted to certain soils, and it is almost an endless task to go through. So far as I am concerned, I have not had so very much experience with varieties. So whatever I say is subject to criticism.

To begin with the seasons and take them in rotation, we will have to take the early semi-cling varieties; and I would take them and throw them away if I had them. And I am in a position to get anything out of them as quickly as anybody; if anyone can get any advantage out of them we could, but I would not set one of them. I have had them and pulled them out. Some man will say that he has made as much or more money out of them as something else; but if I have a ripe crop of Alexanders and there comes up a nice shower, a little hot burst of sunshine afterwards, the skin slips off of them and you can not do anything with them. I do not think that I would set a Hale, although the last two years they have been very profitable. They will tell you on the high lands that the Hale is always profitable, but I do not see any reason for growing the Hale here. The last two years might change your mind, and the next year might make you awfully sick of Hales.

The first good peach, in my estimation, is the Lewis, and I think probably no variety has made more money along this portion of the lake shore than those. And while it is not identical with the Hale, it is nearly so; whatever we may say about one applies to the other, except rot. They are robust growers, sound crotches, and of the Hale type, only they are free from rot and are freestones.

Following these are a good many that I will just speak of. One is the St. Johns, or locally known as "Crane's Early Yellow." Mr. Crane, of Fennville, got some trees a number of years ago for some other variety, and that lot proved to be this variety. He knew it must be of some known variety but did not know what it was. It ripened early, immediately after the Lewis, a beautiful yellow peach with red cheek and good in every respect; people began to propagate from it, and not knowing the name of it, called it the "Crane's Yellow." Young Mr. Taylor was taken to Washington as assistant pomologist. He knew of this yeach—it was in his vicinity—and he began to make an investigation and discovered it was the St. Johns. It is a good sized yellow peach, ripening about a week after the Lewis. It often sells on the market as the Crawford, although it is not a Crawford in anything except growth. The only objection to it is that it ripens on one side softer.

Following the St. Johns some of you would say was the Jacques. It is a little too variable in size and is troubled with a black spot fungus on the side, and cracks in unfavorable weather badly.

I do not know how to leave out of this particular section the Barnard. You will notice I am leaving the white peaches almost entirely alone, but I do not know how to leave out the old Barnard. A good many people complain of its size, but I think it sizes up nicely if you thin it out.

The Conkling is showing up splendid. The Richmond is a great favorite coming in along about that time. And the Crosby is very promising as far as hardness is concerned, and in the main I will speak of what we know as to the hardy varieties. But if the Crosby is going to have a fault, it is going to be a little small.

There is another variety that I would suggest with a little caution and that is the Fitzgerald. People that have seen it at its home pronounces it a wonderful peach. Last winter the Lewis, the Crosby, and the Fitzgerald showed a larger proportion of live buds than any other varieties, and the Fitzgerald a larger amount than any others. The Fitzgerald comes in about the time of the Early Crawford.

Following that is the Kalamazoo, and it is a grand good one. The Kalamazoo is one of those peaches that is of good size, set very heavy with fruit, but after setting it sheds off down to a fair crop.

Following the Kalamazoo, the Gold Drop is my next favorite, but that is one of those kinds which I might speak of in a bunch that no man wants to set unless he proposes to be severe in pruning and thinning, because it will overdo itself. We hear up and down the lake shore that as it gets age the peaches become smaller. Now I believe there is an explanation to that because as it gets age it gets less thinning. Off the Gold Drop of 400 trees last year I took 1,500 bushels. On a ten acre lot we spent 17½ days' work trimming and thinning to the acre, and still this Gold Drop yielded 1,500 bushels; so I do not take any stock in this story going around that the Gold Drop reduces its size except as you allow it to overbear. It is a strong tree and a rank grower when thinned, and has a sound crop.

Following the Gold Drop is the Stevens. I am told that you have the Switzerland and found that very much like this Stevens. This is a very strong grower, stubby limbs, but they do not bear as young as these other varieties, but after they are four or five years old bear regularly. Their coloring is more brilliant and they are a little more downy than "Stump the World"—the down itself takes on a most delicate tint. It is quite a sour peach until ripe and then sweet.

Following that I know of nothing better than a Smock. We always have a certain amount of land to set, and if I can get $2.00 out of the Lewis or Kalamazoo or Gold Drop, while I get one out of the Salway, I do not want the Smock.

DISCUSSION.

Q: How about the Elberta?

Mr. Morrill: It is one of the very finest and the only objection in sight is the liability to curl leaf. It comes in with the Kalamazoo and ripens together. It is a magnificent thing. I have 1,000 trees of it and I believe in it.

Q: What about the Snows Orange?

Mr. Morrill: That is a late Barnard, and comes in so close to the Kalamazoo, I would rather have the Kalamazoo.

Q: Do you know anything about the Foster?

Mr. Morrill: Yes sir, it is somewhat of an improvement on the Early Crawford and not much more productive. The question of soil largely determines the value of some of these varieties. Now, I notice that the Foster and the Crawfords with us on oak land with gravel and clay bottom are productive. This is largely a question of locality which you must determine for yourselves. I would rather have the Elberta and the Gold Drop than the late Crawford for money. I saw a small orchard of Gold Drops this year that every one were perfect clings. Season effects certain varieties that way.

Q: How about the Globe?

Mr. Morrill: The Globe is an elegant peach, but I never succeed in getting more than half a dozen to the row—it makes no difference about the length of the row. The Crosby was larger than the Barnard with us. We had a tree set one year, and it fruited nineteen peaches that were very fair but not as large as the ones on three year old trees. They came through the winter with the buds all alive. But we live sixty miles west of Kalamazoo, and of course the soil may be different than it is here. I have, I think, 200 Crosbys a year old, and there were but very few trees in the lot that did not have one peach on up to a dozen.

Q: Can you say anything for the Engle Mammoth?

Mr. Morrill: Yes sir; I have none, but I have some neighbors that have them, and are very much pleased with them.

Q: Is it true that the Susquehanna, the Globe, the Wheatland, and the Reeves Favorite do not bear well enough?

Mr. Morrill: The Reeves Favorite, by the way, is a very good peach. It is a large yellow, round peach with a red cheek, and a very strong grower. Every Wheatland tree bore here, but I have some eight years old, and they have not cut up that trick yet.

Q: What varieties of peaches will do well on clay ground?

Mr. Morrill: Now there is a poser. There is some clay land that I do not believe any peaches will do well on. I know that if you take the Lewis, or most of those early varieties, they do not seem to do well on it, and as a rule yellow peaches stand it better than white ones.

CELERY.

MR. S. J. DUNKLEY, KALAMAZOO.

Celery, I think, is very nearly identical with the fruit interest. It has to have a great deal of care taken in raising it, and still more in finding a market. Celery was first brought into public notice in the European countries in a wild state. It was green, but the market gardeners brought it into cultivation in the state you now see it. The seed we grow in Kalamazoo is mostly grown in Europe. It is imported. Why it is not raised here I do not know. The soil that we have in Kalamazoo is something without any sulphate of iron in it. I think you have the same soil here along the river. I know the last five or six years they have been raising very good celery all over the United States. They thought once that we had a monopoly at Kalamazoo, but it was simply that we took the matter up first.

PREPARING THE SOIL.

In preparing the soil, if it is dry enough to get a horse on, we use large iron shoes and prepare the land; we run ditches about twenty-four feet, drain it, and then take a kind of shovel plow and make trenches, say four feet apart; in the bottom of these trenches we put in a fertilizer (the most coming thing is the stable manure), and then there are about two inches of the muck laid on top of this, and it is ready for planting. The seeds are sown first for the early crop in hothouses, and are grown the same as you would grow cabbage. They are thinned out, transplanted, and sometimes the tops are sheared off; the frost is out of the ground outside, and they are taken out and set in these trenches from four to six inches apart, (if you set them too close you can not get good healthy plants), and one gang of men will go around setting the plants, and another comes along watering them. There has to be a great deal of care taken just at this time; they require a great deal of water.

We grow thirty acres of land in the north part of Kalamazoo, and our irrigation is perhaps something new. It consists of a large reservoir at the top of a sloping field of thirty acres. This reservoir was filled with a spring, and then had about five large windmills pumping water into that all the time, and tile run down every sixteen feet in the field. When we were plowing we would stop up the tile, and when the field got too wet we would let the field drain itself. Some of it requires lots of moisture, but does not require that the roots should stand in water.

CULTIVATING.

After the field is planted and the proper care taken to see that the roots start and the weeds are kept out by going through with a cultivator kind of shovel plows that we have especially adapted to the purpose, and in about two weeks it is ready for the first looking after; that is, to get the weeds away from the plant; and then it is gradually hilled up as it grows until it is three to four inches above the roots. When the time comes for bleaching, we have a hoe about that wide, forcing the soil right up, and we go along the other side pulling it up the other way until finally all you have there is a field of green leaves sticking out of piles of soil. Two or three weeks of this hilling will bleach the celery if the weather is right. If the nights are cold and the days warm, as it was this last fall, you will have very hard work in bleaching it. One point, we do not bleach celery in warm weather; it is impossible until the last week of September or the first of October. It is also bleached by taking a board and drawing it up so that it will come on a little bit above the base of the leaves, about six inches apart. You will have to watch that very carefully to see that the sun does not scorch the celery, but fourteen days of that kind of bleaching will bleach celery. But it is not this kind of bleaching that I am speaking of.

When we first grew celery we grew it on the uplands and got 60 cents a dozen for it and never took it out of the ground before the frost came; but they kept wanting it earlier and earlier until now it is about as early as I believe we can grow it. Celery, after it has attained its full growth and is bleached, is taken and put away the same as you would cabbages for the winter and is shipped all over the U. S. by express and the large crops in refrigerator cars. When celery was first raised at Kalamazoo there was a very limited market, and when they found that it was growing rapidly into favor and that our north marshes were especially adapted to it, the acreage increased so fast that there was thousands of dollars' worth spoiled. It was first sent to the commission people in Chicago, and I do not think I need to dilate on that subject at all, but we found that it would not do. It is now sold about as low as it ever will be; we sell it at 15 to 22 cents per dozen. That is quite a difference from 35 cents. I think that probably fruit growing will come to that, that the price you will get for fruit in the future will be something like what we get for celery according to the cost of celery. If we get 15 cents that would be about 100 per cent.

EXPERIMENT STATION AT SOUTH HAVEN.

T. T. LYON, SOUTH HAVEN.

I would state to begin with that if I were to begin this work today, with the experience of the last few years, I might do it in quite a different way in some respects. The soil on which the Station is located is in some respects peculiar, with much variety. The country seems to have been originally covered with timber, which had been blown down and large amounts of earth left where the stumps were overturned, leaving hummocks. In some places there is a subsoil of poor drifting sand. Again, an occasional spot with sand mixed with iron ore becomes impervious to water, and if I had the authority and means, my plan would have been to put the subsoil plow through this and mix up such subsoils as those, not to bring them to the surface to be sure, but to break them up in such a way that trees would not be damaged. I have cherry trees placed under the same apparent circumstances, one of them three or four times as large as the other. These differences might thus have been prevented to some extent.

The institution has been engaged in experimenting quite largely with strawberries. Perhaps a dozen or two varieties might occur in a very unfavorable spot, but could not be detected because the unfavorable condition occurs in the subsoil, and hence the comparison is not satisfactory, and the consequence is these experiments must be tried over and over again that the average of the results may be more equal. We readily understand that a strawberry plant having fruited once will never fruit again unless it can produce new crowns and new roots. In the location in which we have been accustomed to plant them, they, to some extent perhaps, exhaust the soil during the first year's planting. A remedy for this might have been to plow away a furrow from each side of the row, put in some nicely decomposed manure which it would take a year to produce, and turn the furrow back and give the plants the advantage of this. This has not so far been done.

DIFFICULTIES.

Again, we are here quite subject to drouths and heat, with very hot weather at the time of the ripening of the fruit. During the past two or three years this has been a very serious calamity so far as results are concerned. The crop of the second year back was a wonder to many who saw it in its promise, and while it was yet in a condition to show what it might have done, hot weather and drouth occurred, and perhaps more than half the crop was utterly ruined. At present there is no way of avoiding these results. Last year was even worse. Perhaps we all in this vicinity understand that no year within the recollection of most of us has been so severe so far as drouth is concerned as the one now past, and the result of all this is that the comparison of varieties becomes quite unreliable on that account, and only a repetition of these trials will suffice to really and satisfactorily determine the actual relative value of certain varieties. There are upon this place this year from 160 to 170 varieties of strawberries. Five hundred varieties of strawberries have been tested upon the place within the last twenty years since I have had to do with it, and every season since the Experiment Station was established a large number of these have been dropped and their places supplied by others entirely new and untested. And yet, during that twenty years or more, perhaps all the varieties that have shown themselves to be really valuable can be counted upon the fingers of one hand. This, to my apprehension, shows that we are radically wrong in our processes of introducing varieties, and that there should be, if possible, some method by which new varieties could be kept out of the market until they have been fairly tested and the fact of their worthiness established. How this is to be accomplished I am not able to say. There should be some measure adopted by which this testing can be done by experts charged with such duty; and the millions of dollars annually expended for these novelties saved to the planter.

There are upon the Station grounds at the present time I am not able to say how many varieties all told, but there are strawberries 170 varieties, some 50 or 60 varieties of raspberries and blackberries, about 300 varieties, I think, of peaches, 100 varieties of pears, 100 perhaps of cherries, and some 200 or 300 of apples. Of these a large proportion, including nearly all of the small fruits, have already fruited at least once. Of the peaches at least 100 or 150 fruited last year, and of cherries nearly all the varieties on the place have fruited more or less, but not so fully that we can determine their value. Apples, of course, and pears, have been more slow in coming into bearing. It has not been the policy so far to give what would be called intensive cultivation, and that for the reason that the experiments are intended for the general public, and if we were to get higher results than could be reached by the general public, the result would be a disappointment, and the reputation of the Station would probably suffer in consequence. For this reason the aim has been to give clear, clean culture, reasonably good manuring, and to secure such results as every good cultivator ought to be able to secure with the same varieties.

This has been the policy so far pursued, and I so far have seen no reason why it should be essentially changed. There are in the collection a large number of varieties that I have myself tested on my own responsibility, very thoroughly. They are introduced because they may produce different results here. Something like this is the policy that has so far been pursued, and the grounds are now pretty nearly filled with varieties. There are comparatively few vacancies yet to be filled, and hereafter unless the territory can be extended, it will become necessary, if new varieties are to be introduced, to do it by regrafting. I regret that I feel obliged to say, as intimated by Mr. Morrill, that a very large proportion, particularly in the case of peaches (I think I can safely say that fully one-half), the varieties that have been obtained from supposed reliable establishments, have proved to be spurious. I suppose it may be possible to cut these back severely in the spring for the purpose of forcing out young shoots, upon which other varieties can be budded. You all understand grafting peaches proves impracticable in this climate.

IN THE MATTER OF TESTING STRAWBERRIES

I presume that very few of us have failed to recognize the circumstance that few, if any, of our varieties have lasted more than a few years, and when in season have tested satisfactorily, but they soon seem to run out; they early become a prey of insects or fungi. What may be the reason for this I presume has not been determined. I have very frequently heard the remark that sometimes we find, among our strawberries, plants that produce plenty of runners, but very little, if any, fruit. That is perhaps a problem that might be worked out by such a station as this. It has appeared to be quite desirable that experiments should be instituted intelligently for the purpose of determining the effect of various processes in securing the continuation of one kind, instead of being obliged to accept something new and untried. I suppose a great many persons can recall the introduction of the Wilson, which continued before the public thirty or forty years, if not more, and even now popular with some persons, while other varieties, like the Haverland, well received and popular for a time, and even yet perhaps, though less than ten or fifteen years old, have begun to show signs of failure, and we are looking for something still newer to take their place. Now, it would be a very desirable thing to learn just why this is the case, and whether it is possible to secure the permanency of varieties which we consider valuable.

Perhaps some of us will recollect the time when there was a very earnest competition through the press respecting strawberries; there were those in my recollection that held the idea that there was no such thing as an imperfect strawberry blossom, that they were all perfect. Today we recognize the fact that we have pistillate varieties, and those that are bisexual. Why this is the case may not be generally understood, may not be generally accepted as a settled fact. I recollect that soon after I came to this place, about twenty years ago, Mr. Hathaway, of Little Prairie Ronde, introduced some very good varieties of strawberries, using the Virginia Scarlet, fertilized others, and followed up that process from time to time, until quite recently anyone visiting his place and looking over his seedlings, which he grows by the thousands, will find that there is a strain of varieties with perfect similarity in certain respects. This he persistently carried out until he secured a family resemblance. There is a family resemblance running through almost all his seedlings coming from that strain.

A few years ago I sent a man out into the field when the strawberries were beginning to blossom and asked him to bring me a report as to the sex of each variety. He went over the plat and brought in a list. Almost all of them were pistillate from his showing. My observation upon that revelation satisfied me that there is not absolute permanency in the character in some places, and that permanency is effected sometimes by weather. I do not know how far, but to some extent, the influence of the weather may produce permanent results in the way of change.

So far as the work of testing varieties is concerned, the value of the small fruits, and especially the strawberries, can be determined with considerable rapidity. This is not equally true when we come to the large fruits. We occasionally find a variety producing most admirable fruit, and when once fully in bearing becoming practically worthless. And again, I have had occasion to observe that varieties when coming fully into fruit will produce imperfect fruit. It requires, in the case of apples, especially in the case of pears, a series of years, perhaps six to twelve years, to properly determine the relative value of a variety so far as the character of its fruit is concerned. Consequently, it will require quite a number of years to determine in the case of these fruits whether the variety ought to be dropped, no matter how valuable apparently, but unless dropped, after it has been sufficiently tested, our territory would stretch beyond the possibility of a station in a little time. The tendency in the east has been to grow trees with high tops. The tendency at the west is to get about as low as they can. We are intermediate, and there are a great many reasons why we should follow the western practice rather than the eastern; while eastern fruits generally succeed with us here, they need more protection from the hot sun and winds than at the east.

THE CULTIVATION AND CARE OF BRAINS.

ROLAND MORRILL, BENTON HARBOR.

It was suggested to me this evening that probably a mistake had been made, a misprint in the program, and that my topic might be "Cultivation and care of beans," instead of brains. Now as a matter of fact having never harvested a crop of either I am as well prepared to speak on one as the other. Whether I have cultivated either successfully I have not given the matter any thought, but will take the program as it reads and say what I can on it.

I presume you will all agree with me that the most valuable crop we cultivate today is "brains." It is the most essential crop on the farm and our surroundings and environments are somewhat against the proper culture of the crop. Brains as a farm crop mature during the winter months. We work hard through the long summer months. We see a great deal. We learn some things. New ideas dawn upon us, but we have little time to digest these things. What we speak of as brain food must be digested and assimilated before it can have much value for us and this can best be done during the winter months when we have the experiences and observations of the past seasons to draw conclusions from. The methods by which we may cultivate our brains are numerous and I think is one of the most important topics that can be presented to the farmers today, and I wish that you had a lecturer who could present the matter to you right, one who had preparation and knew what he should say and how to say it. I will only say that the man who does not cultivate his brains although he may have ten pounds of them cannot keep up with the times and that is the principal object in horticulture. I say the principal, but not the sole object, but it is a subject that requires a trained mind, requires study to handle.

Mr. Garfield has told you of the value of institutes. He has told you in a very concise way what this one should be, but no man can stand here and tell you in a straight hour what you should do in that line. It is the commencement only that he has told. I cannot tell you what you should do, but it is about the only schooling we older people can get. We come together and compare our results. If we are true to our business, we will report our failures. We cannot cultivate our brains without reporting and discussing our failures as well as our successes. A trained mind is always safer than one untrained, and no mind can be trained until it knows the probabilities or possibilities of success in any line.

Caution is one of the best things we can train our minds on. We do not want to become over cautious, as the man who is over cautious seldom "gets there," but the man who is reckless "gets there" too soon. Some men are quite well balanced, but never quite so well as though they had the benefit of a careful training.

At these institutes we come together and wish to speak only of the things that we all meet; we come together and study one another's methods; we learn from one another what each one knows. Oftentimes a little idea crops out in discussion which is valuable to somebody, to me or to you; we wonder that we had not thought of it sooner. Simple things mean a great deal sometimes, and they will follow up with ideas that we can apply in our business.

Last month I was at Rochester, N. Y., at the meeting of the Western New York Horticultural Society, and noticed that Prof. Roberts, of Cornell University, came there with sixty of his students who were taking what is known as the short course. Men who have left their business and their farms to go there and cultivate their brains, probably to get training in some special line, but open to every opportunity to gain knowledge. So they came in a body and sat with this society of trained skillful men and gathered all the ideas possible from the discussions, and I assure you it is one of the best places in this country to get reliable information in horticulture. I presume Prof. Roberts gained some new ideas while there, as he is a close student himself.

We sometimes find men who think they have learned all there is to know about certain things. Such men are really to be pitied. When a man gets to that stage it means simply that *his* development in that line has ceased, "nothing else." Men who have capacity understand as they become old that the ideas that they once thought they had fixed to a certainty have since become great uncertainties to them. They have certainly learned that no man knows all of even one method in horticulture. There are fixed rules in mathematics and sciences that men can depend upon, but in horticulture we find new complications, of weather, fungous troubles, conditions of soil, drainage, atmosphere, and everything of that kind coming up, and they can make a thousand complications. The man who combats his enemies successfully is a genius, and the knowledge does not always come out of the schoolroom either. These things are naturally born in a man, I believe, but they require careful training. He must learn from his neighbors. He may have a plan fixed in his mind because it is successful with him, but he does not know what complications his neighbors are dealing with, and they disagree. And it is only by coming together that we can get at the facts. We could go on, if I could, for hours calling your attention to these matters, but I do not think it is necessary, because you will want to do some talking and I do not want to take all your time. But I am sorry to say that in my travels around the State this winter, where we find two, three, four or five hundred farmers and their wives coming together at Institutes, a little inquiry usually shows the fact that a large majority of them do not know he value of this training. It is to be regretted, because the day is fast approaching when the man who does not cultivate his brains is not going to keep up in the race, and the community becomes poorer, while it should not be so. We have had what some men call a trying year, still some men by peculiar conditions which exist with them through their own efforts, or through their advantages, have succeeded. When it gets down to a point where it is barely a turn of the hand between success or failure, then is the time that a knowledge of our business becomes important; in fact it may mean bankruptcy or success in business, to do the right thing at the right time and not the right thing at the wrong time. There is such a thing as doing the right thing at the wrong time. These things must come by training; you must learn it yourself or learn it from some successful neighbor.

We find men among farmers, I am sorry to say, who, the moment a neighbor becomes successful, feel envious towards him; they think he is getting too smart and needs pulling down—you know whom I am talking about probably; I never saw a neighborhood yet that did not have one. But such men are to be pitied, but it makes no difference what those men think, we have got ourselves to take care of. Therefore, get knowledge.

REPORTS FROM EACH INSTITUTE.

The following reports from each institute are furnished by the conductors sent by the Board. The names of conductors can be found in the schedules on pages 24 to 40:

ALCONA COUNTY—HARRISVILLE.

This Institute was an undoubted success. The lecturers furnished by the State Board of Agriculture were all well received. The institute was well attended by a large number of progressive farmers, many of whom expressed themselves as not having heard just what they expected, but that the unexpected had been of great benefit to them. The local leaders were willing to take part and impart information to their fellow craftsmen. The best of feeling existed through the meeting. Much of the success is due to the efforts of Mr. J. Vanbuskirk, who conducted the program with intelligence, dignity and impartiality. We believe every farmer went home from the convention proud of his calling, and proud that he can use his talents to dignify and ennoble it.

ALLEGAN COUNTY—FENNVILLE.

This Institute was one of the very best attended last winter, having an attendance of 250 to 400 at each session, and many could not find seat room in the hall. The woman's section, under the management of Mrs. Mayo, was reported a success in every particular. The only obstacle that I can see to holding exceptionally large and enthusiastic Institutes in Allegan county is that it must be held either in the extreme eastern or extreme western portion of the county, as the county has a barren sandy stretch of country separating the eastern from the western parts, with, to say the least, very tiresome roads. But each side has a wealthy country filled with bright men and women, from among whom the local committees can always draw plenty of able material for the program. We were impressed with the exceptionally high character of the papers presented, as well as the ability with which they were discussed; but the greatest interest and enthusiasm seems to prevail in the western part, or fruit belt.

ALPENA COUNTY—ALPENA.

Alpena is pretty well north, and even its enterprising people admit that it is new. Lumbering is still an important industry, and other manufactories are coming into the town. As we visited the town for the first in winter, when the snow covered the ground, and as our time was fully occupied at the Institute, we had little opportunity to judge of the value of that region, except from statements made by the people. Everyone we met believed in his county, and predicted a good future for the agriculture scarcely yet well established. Lands are cheap and productive according to all reports; the people unusually energetic. Farmers are not yet very numerous in this county, nor have many of them had a long experience in the business. About fifty was the average attendance; no women seen among them. The townspeople, with rare exceptions, gave little heed to the good work attempted. We think with some efforts another year, more may be induced to attend.

ANTRIM COUNTY—MANCELONA.

The Institute was held in the Congregational Church at Mancelona in January. During the first and second sessions, the Institute was not as largely attended as could be desired, but the attendance and interest seemed to grow with each session. The program was quite full, and for this reason hardly time enough was left for the discussion of the various subjects. The local newspaper, the "Mancelona Herald," aided greatly in advertising the Institute, but the attendance seemed to come largely from one section of the county. It is to be regretted that farmers from all over the county did not avail themselves of the privileges of the Institute.

ARENAC COUNTY—STANDISH.

The attendance at this Institute was small, owing to the lateness of the final decision to hold an Institute. The interest, however, was good from the start, and the papers by local and outside speakers were thoroughly discussed. Much of Arenac county lies comparatively low and level, with a heavy soil, particularly adapted to the grasses. Dairying is already an important industry in the county, and dairy topics received especial attention at the Institute. The closing session was varied by educational subjects and by music by pupils from the high school.

BARRY COUNTY—HASTINGS.

This Institute was a success in point of interest and attendance. The weather was severely cold, and the hall was both poorly lighted and heated. It was impossible to keep warm in the rear of the room, and we think that without an exception the speakers all took cold. The program was one of great length, the fullest in fact of any Institute we attended, and the subject matter was all good. The only criticism heard was that there was so much of it that there was no time left for discussion of the topics presented. The local officers of the association were very energetic and to their effort was due much of the success of the Institute. The good people of the city made everyone welcome, and when the Institute closed, warmly pressed all interested in this good work to "come again."

BAY COUNTY—BAY CITY.

The Institute at Bay City was a good one, though fewer farmers were present than we expected to see. The hall was never comfortably warmed, and perhaps this prevented some from attending the meetings. It is the common experience of Institutes in Michigan that if we want to get near the farmers and call them out and interest them, we must seek them, not in cities, but in the small villages or in the country.

BENZIE COUNTY—FRANKFORT.

The Institute held in Frankfort was considered a success. The chairman, Mr. P. G. Holden, was awake to the interests of the occasion and kept matters moving along briskly and to the point. The local talent was well represented and did its part commendably. Music, one of the greatest aids to the interests of an Institute, was furnished by the Benzonia band. Music was good and there was plenty of it. The hall was not well calculated for such an occasion, but the patience of the audience was good, and though each session was crowded the order was excellent and the people good natured. We would suggest that the citizens of any town where an Institute is held should show their interest by a good attendance of the business men and women. Agriculture and trade in towns are intimately connected, and both should take an interest in that which will prove of interest to both town and country people. There is no doubt that much good will result from the work done in this Institute.

BERRIEN COUNTY—ST. JOSEPH.

At St. Joseph the conditions were much like those at Hart, but being at one side of the county the attendance was largely local. Another reason for this was that the southern and eastern portions of the county are largely devoted to general farming, while the program was for the most part made up of fruit topics, particularly adapted to the needs of the people in the vicinity of St. Joseph. As might be expected the subjects of peach and plum culture, and the related topics of cultivation, irrigation, and spraying, brought out the largest number of questions, but the papers relating to taxation and currency led to animated discussions. The attendence was good, especially at the afternoon sessions.

BRANCH COUNTY—COLDWATER.

A question box had been placed at the entrance door of the church parlors where the Institute audience assembled, but it was found to be a useless piece of furniture, for every listener was a question box himself and flew open the minute there was an opportunity. Branch county is the home of some of the best farmers of which Michigan is so justly proud. These men were present, and with their wives had prepared papers for the program, and entered into lively and profitable discussions of themes of interest. The evening sessions, held in the church above, taxed the seating capacity of that large auditorium. The superb singing of the Choral Union, under Dr. Andrews, and the high school choir, directed by Principal E. H. Harriman, added great attraction to the evening programs.

CALHOUN COUNTY—BATTLE CREEK.

Those of us who had previously attended meetings of the Calhoun Farmers' Institute knew that organizing under the State law would not diminish the attendance, but rather add to the enthusiasm which for ten years and more had marked their Institutes. Nor were we disappointed, for, though the opening morning found the streets one sheet of ice, and the clouds dropping rain which froze as it struck, there was no dampening of ardor from these slight causes. The auditorium was an ideal place for the comfort of the audience, but when it came to coaxing the woman's section, led by Mrs. Mayo, to meet "down stairs in the kitchen," the ladies said nay, and overflowed into the church parlors near by, where standing room soon demanded a premium. Though the Battle Creek farmers know a good thing and appreciate it, they were generous, and after a slight effort to the contrary voted to hold the next Institute at Albion.

CASS COUNTY—CASSOPOLIS.

The late arrival of the Institute workers, together with the freezing rainstorm of the night before, made the first session short and the audience small. This pushed some of the papers into the afternoon program, which was already overcrowded. At but few, if any, Institutes was greater interest manifest, as shown by continuation of discussion after formal adjournment, and by early return after meals. It is worthy of note, with a view to correction, that the program for each session had too many articles, and this left too little time for discussion. Great pains were taken by the local committee to have the Institute workers personally meet as many as possible of those present. The local association was fortunate in its choice of an excellent presiding officer, one acquainted with many of those present, and one who allowed no time to go to waste. Another noticeable fact was the number of young people and younger farmers present. In many counties a large portion of the audience were men gray and bent with years of toil.

CHARLEVOIX COUNTY—CHARLEVOIX.

Charlevoix is a beautiful summer resort in the midst of a new and thriving agricultural section adapted to fruit growing and general farming. The Institute was a success in every way, owing largely to the enterprise of the committee of arrangements and the liberality of the local paper, the "Charlevoix Democrat," which published programs and notices free of charge and printed a full stenographic report of the meeting. The papers by residents of the county were of more than usual excellence and covered a wide range of topics. Music enlivened the evening sessions, which were particularly well attended.

CHEBOYGAN COUNTY—CHEBOYGAN.

The brightest kind of a day smiled on the opening of this Institute, and good weather continued throughout the sessions. While the attendance at no session was very large, we had plenty of interest manifested. Many farmers came from distant points in the lower part of the county. Mr. LePres, to whose efforts the holding of the first farmers' Institute in Cheboygan county is largely due, expressed himself well satisfied with the beginning made.

CHIPPEWA COUNTY—SAULT STE. MARIE.

Chippewa county is one of the best farming counties in the State, possessing for the most part a heavy soil, well adapted to the ordinary grasses and grains, including oats and wheat. Stock raising and dairying are important industries in the county. The attendance at the Institute consisted mainly of prosperous farmers from various parts of the county, and the several sessions were devoted almost entirely to the discussion of practical farm topics. One evening, however, was given to forestry, at which several valuable local papers were presented. The Institute was fully appreciated by those in attendance and by the local press.

CLINTON COUNTY—ST. JOHNS.

The Institute at St. Johns was fairly well attended, but not as well as it should have been when held at the county seat of so prosperous and populous a county as Clinton. But those in attendance were mostly farmers and their families, and all present were interested. The officers of the Institute society were prompt and energetic in discharging their duties, and the papers by local speakers were well prepared. Lack of space forbids separate mention of each. The subjects assigned were fairly well adapted to local conditions, especially those on "Wheats for Michigan," "Small Fruits," and "Tillage for Drouthy Seasons." Clinton county farmers follow "mixed farming," and fruit growing is confined mostly to apple orchards and small fruits for the garden. We have no criticisms on the conduct of the Institute, or on the interest taken by those in attendance, and assign no reason for lack of attendance in such numbers as should be expected of that locality.

CRAWFORD COUNTY—GRAYLING.

Grayling is a typical lumber town of northern Michigan, the county seat of Crawford county, and located on the upper waters of the Au Sable river. Lumbering is now on the decline and the people are beginning to turn their attention more to agriculture. A large amount of unoccupied land exists in the county, especially adapted to sheep raising, and numbers are beginning to engage in that business. On the more elevated timber lands of the county fruit growing is successfully carried on. The question of forage plants adapted to that region attracted much attention at the Institute.

DICKINSON COUNTY—NORWAY.

We have to report a very small attendance at Norway. Dickinson county has considerable good farming land, but in common with most parts of the upper peninsula, farming has not been attempted until very recently. Many of the farmers are former miners, and have taken no special interest in improved methods of agriculture. Nevertheless, those in attendance at the Institute were intelligent, energetic men, who are very much in earnest in regard to the agricultural prospects of the county. The meeting was poorly advertised owing to the absence of the secretary, and no doubt would have been better attended if this had not been neglected. The lectures were well received by those present, and we feel confident that succeeding Institutes that will be held in this county will be well attended. There certainly is great room for work in this direction, and I believe when the objects of the Institute work are thoroughly known the people will be glad to take advantage of them. This is a large county, and the location of the Institute should be changed annually in order to better reach the residents of the different sections.

EATON COUNTY—CHARLOTTE.

The opening day of this meeting was cold and stormy, but the attendance was fair and increased from session to session until the large court room had not sufficient capacity to hold the crowds that came. The officers were capable and faithful, and the conductor had but little to do except to say his say. In this county the farmers have done a good deal of associated work and this adds very much to the ability of local workers. The papers and discussions which followed were good. Eaton in soil and population is one of our best counties. It is hard to tell what special subject interested them the most here. Road making, dairying and wheat raising seemed about equally to claim attention. The Institute was held on the day for the annual meeting of the agricultural society, and this may have detracted a little from interest in the Institute work, for Eaton county is justly proud of its fair.

EMMET COUNTY—HARBOR SPRINGS.

The Institute at this place we found under the general management of an old college classmate, Mr. John Swift, and although not noted in the past as taking especially after his name in action, certainly kept the meeting moving successfully. The program was much broken by the failure of outside speakers to reach their appointment at this place, still the time was well filled by local talent. The discussions were all lively, and on each topic much of interest to the section was drawn out. We confess we were surprised to find such thorough, up-to-date, large farmers living so far north in the State. The sessions were well attended, on the last day about reaching the capacity of the hall; yet the date of the meeting was unfortunate. It should be a month earlier, before the farmers are engaged in lumbering, which is the winter work of many. Outside assistance to Institutes in this section should be largely along the lines of horticulture and dairying. They are adapted to the country and the summer resort business makes both lines of work very profitable.

GENESEE COUNTY—GRAND BLANC.

The Institute at Grand Blanc was largely attended. The hall, which holds six or seven hundred people, was not large enough to accommodate those who came at any session, and each evening the overflow was large. The organization at Grand Blanc is very complete, an Institute having been held each year for several years past. Hence the local speakers were well prepared. The Institute was well advertised, the officers of the association were prompt and energetic in the management of the meeting. The only criticism, if any, regarding the program, is that it was too full and did not leave enough time for discussion of topics presented. This is a common fault in Institute meetings, and care should be taken in this respect. It is easier to fill in time than to cut out topics already on the program. In a county like Genesee, two or three institutes held in different sections would each be as well attended as this one. If possible, the location should be changed each year in order to reach the people from all parts of the county. Farmers will not, to any great extent, go more than five or six miles to attend institutes. The speakers employed by the Board of Agriculture were well received, and most of them were entertained by the people of Grand Blanc at no expense to the Institute fund.

GLADWIN COUNTY—GLADWIN.

Rough roads and the sudden advent of winter weather kept many of local speakers from being present, and diminished the attendance during the day sessions; however, each evening the old court room was crowded to the doors by the townspeople. Gladwin and vicinity is paying a good deal of attention to orchard planting. The land being rolling provides nicely for thorough atmospheric drainage, so that a few years hence will see Gladwin developed into a fruit county.

GRATIOT COUNTY—ALMA.

Among the more successful Institutes held in the year, the one at Alma takes front rank. The interest shown by the managers and the community, both in town and county, was very encouraging, not only to the farmer, but to the tradespeople as well. The State Institute occupied two days, but the local management, by its interest in the subject, held an excellent institute during the day preceding the regular one. Unbounded enthusiasm was a prominent feature of this Institute from start to finish, not only on the part of the farming community so numerously represented, but the people in the town of Alma seemed equally interested, as shown by their attendance through all its sessions. President Cowdrey brought matters connected with the work out on time, and no time was allowed to go to waste. The question box was a grand feature in this Institute, and plenty of questions were presented and answers given. In this connection we wish to say that we regard this feature of an institute as a very important one. Less set papers and speeches, and more time devoted to this subject, would, in my opinion, add much to the good to be accomplished in holding Farmers' Institutes. The joint work of the schools of Alma with the farmers' work added much to the value of the work done. Music was plenty and of a high order. At one time, when the city schools were present *en masse*, it was estimated that eight hundred people were in attendance at the same time. The Institute was a grand success from start to finish, and the management may well feel paid for their arduous labors by the results obtained. Three cheers for Alma!

HILLSDALE COUNTY—JONESVILLE.

Although the attendance was not large, it was fairly representative, and farmers were present from nearly all of the townships. While topics relating to general farming were of greatest interest, there seemed a tendency towards such spcialties as fruit raising and dairying. In addition to the local speakers and those furnished by the Board of Agriculture, the committee of arrangement secured the attendance of two well known fruit growers, Messrs. Woodward of Clinton, and Kelley of Litchfield, whose papers were full of good points and brought out lively discussions. The school question occupied the first evening of the meeting, and the merits and demerits of the township unit system were discussed by Prof. J. E. Hammond, Deputy Superintendent of Public Instruction, and Prof. W. H. French of Jonesville.

HURON COUNTY—BAD AXE.

At Bad Axe there was a crowd in the court house; everybody turned out and considered himself an important factor of the meeting. We were in the midst of a fine farming country. Men and women had become used to taking part on such occasions by long practice in the granges of the county. There is little danger of having a small gathering of farmers' families at an Institute in Huron county.

INGHAM COUNTY—DANSVILLE.

Although Ingham county has had many Farmers' Institutes, it happened that the little village of Dansville had never been thus favored. It is a well known fact that an Institute draws the majority of its attendance from a district which has a radius of about five miles from the place where the Institute is held, so that this Institute accommodated a body of farmers who had had little experience at institutes. The discussions at this Institute were not participated in quite so freely by the local farmers, although there were several exceptions to this. But in the matter of asking questions, we attended no Institute during the winter at which more intelligent and pointed questions were asked. There was no need to suggest that the questions should be confined to the subject in hand. This is a strong feature of any gathering where discussions are in vogue. The Institute was favored in having a church for its meeting place, which was very commodious and pleasant. This meeting was well attended, as the statistics will show. There was a slight tendency, on the part of one or two speakers, to occupy considerable time. We believe it is an essential feature of a good meeting that the formal talks be short, not over fifteen or twenty minutes, and that the discussions be the main feature, presenting thus a running fire of questions to the speaker, and giving brief experiences.

IONIA COUNTY—IONIA.

Evidently this Institute was thoroughly advertised, and but for a bad sleet storm on the second day the opera house would have been overcrowded. Even as it was the aggregate attendance at the six sessions slightly exceeded 2,400. The number and character of the observations and inquiries made through the "question box" and in connection with the papers read, showed clearly that the people of this county are fully alive to the necessity of keeping "posted," and that they mean to utilize every opportunity to acquire the latest and best information. Perhaps fruit growing, and the dairy and related subjects, brought out most discussion, but with so full and excellent a program it would be futile to attempt to indicate the papers of greatest value and interest. A marked feature of the meeting was the perfect freedom with which, when time allowed, each subject was discussed, no one appearing to have any professional secrets to conceal from his neighbors, and some of the most helpful discussions being introduced by straightforward confessions of failure, invitations to criticise, and an evident disposition to sacrifice personal feelings in the interest of the common gain. The people of Ionia county have reason to feel proud of the success of their Institute, knowing that it was a merited result of hard work properly planned.

IOSCO COUNTY—TAWAS CITY.

The land along Lake Huron is somewhat sandy, but a few miles back there is some of the best farming lands. Fruit growing is receiving considerable attention here, for which industry the country is well adapted. While the interest taken by those present was strong, the attendance was light, showing that those having charge of advertising and the arousing of interest in the residents in the country around the city had not done their full duty. Great interest was shown by those present in the fruit, potato and forage crop topics. The evening session, devoted to the school question, was well attended, and the talks and discussions were very interesting and doubtless productive of much good.

IRON COUNTY—IRON RIVER.

A pleasing characteristic of the Iron River Institute was the cordial assistance of the professional men in the town. Teachers, lawyers, ministers, and editors were in constant attendance and were very helpful not only in stated contributions to the program, but in starting off the discussions. If the large hall had been embellished with the soil products of the vicinity it would have added greatly to the attractiveness of the meeting. The farmers about this place evidently did not fully understand of what value an Institute would be to them, and although the local papers kept the matter before the public each week for a month in advance, this was the first thing of the kind ever held in the place and the attendance was not large. The program was finely printed and there was admirable work done by the county secretary. To his activity the success was largely due. There was a cordial feeling engendered here that brought the people pleasantly together between sessions at the hotel, and this added materially to the effectiveness of the Institute. The discussion in connection with the paper on flax culture was very animated. There seemed to be a morbid interest in market gardening.

ISABELLA COUNTY—MT. PLEASANT.

A peculiar feature of this Institute was the preliminary meeting the day before the arrival of the regular State workers. The Institute spirit was already waked, the preliminaries all passed, and the audience prepared by acquaintance and enthusiasm to give the speakers a hearty reception, and thoughtful hearing. W. W. Preston, the president, was an excellent presiding officer, and left the conductor little to do in managing the Institute. The writer attended the first Institute ever held in the county, and could note the great advance in farm education in the intervening six years. Then, the editor of the "Enterprise," A. S. Coutant, and one or two of the village residents, were the visible and sensible exponents of Institute interest at the meeting. Now, a score of good farmers were active workers, leaving the scribe to attend to his reports and the citizen of the town to the enjoyment of the fruit of their labor. Now almost every township in the county has its farmers' club, and representatives of every one were present at the Institute working for its success. An exhibition of honey here loaded the tables, and emphasizes the importance of providing a room for the display of farm products, other than the audience hall. This could be made an instructive feature of every Institute.

JACKSON COUNTY—PARMA.

The exercises were held in a church; the attendance was good from start to finish; the interest was intense. Many of those who furnished the literary entertainment had participated in farmers' clubs and grange meetings. The entire program was executed without a break, skilled debaters were plenty. The critics were there in force, and the Agricultural College was not altogether spared, but all things were done pleasantly and good naturedly. In general interest, and I believe usefulness, this Institute ranks with the best. The people of Parma generously entertained the workers without fee or reward, and it was right royally done, too.

KALAMAZOO COUNTY—COOPER.

The Institute was held in the center of a rich farming section, and the topics were for the most part those which would be of particular interest to the general farmer. This was one of the first counties to hold Institutes, and the results were apparent in the character of the papers presented and the ability shown by those who took part in the discussions. Another admirable feature was the delightful manner in which those from a distance were cared for by the farmers living in the vicinity of the church where the Institute was held. Not less to be commended were the arrangements for music and recitations by which the sessions were enlivened. Although the weather was very unfavorable upon the closing day of the Institute, the attendance was so large that it would have been impossible to have crowded a dozen more persons into the church at some of the sessions.

KALKASKA COUNTY—KALKASKA.

The Institute at Kalkaska was the first ever held at that place. On the opening day the weather was very forbidding, but it took more than bad roads and a cold drizzling rain to dampen the ardor of those who were responsible for the Institute coming to Kalkaska. Concerning the meetings only general comments along the line of favorable criticism are to be offered. While the meetings were not so largely attended as some the discussions were sharp and to the point, and the promptness and precision with which men spoke, gave evidence of a training for which they have their farmers' organizations to thank. Here I think was held the first of a series of women's meetings, conducted by Mrs. Mayo, and the ladies boasted of having as large a meeting as the men, and they thought a better one. Such was the enthusiasm at the close of the meeting that the question of holding a summer Institute was under discussion.

LAKE COUNTY—LUTHER.

The Luther Institute was an enthusiastic gathering. Here bad weather contributed its share toward the disappointment of those in charge, but nevertheless the attendance was good, many coming by rail from the other side of the county. Among these enthusiastic ones was Robert Joiner, of Chase, a twelve-year-old farmer who had come alone among strangers with only a letter of introduction to the secretary of the Institute. Only as lumbering has failed to yield a profit, has farming been resorted to in the region of Luther, and so from an agricultural point of view the country is new; but the farmers are wide awake, and don't need to be told how to raise potatoes. Much interest was manifested in the raising of fruit, especially peaches.

LAPEER COUNTY—LAPEER.

The Institute held in Lapeer was somewhat of a peculiar nature—peculiar from the fact that the local talent in a large measure made it a place to vent their good or ill will about passing events, such as taxation, free silver, tariff, the purchase of stock for the Institution for the Feeble Minded, etc., with some matters pertaining to farming thrown in. The court house was used for the occasion, and though it was court week Judge Smith kindly divided the time and gave most of it to the work of the Institute. The weather was inclement and the attendance not as large as it would otherwise have been. Those having the work in hand did all they could to make it successful. President Lee was on hand during the different sessions and kept matters moving along in good order. The secretary was accommodating and active in his duties. It would seem that in a town the size of Lapeer more music could well be furnished. What was furnished was excellent, showing that more might be made available. The address of Gov. Rich on taxation brought out a very animated and somewhat acrimonious discussion. Whether such subjects in Institute work are very beneficial is a question upon which men and women will probably differ. The discussions brought out at this Institute, to our mind, did not add materially to the good of the Institute.

LENAWEE COUNTY—ADRIAN.

The Institute was largely attended. The woman's section was an interesting and instructive feature of this Institute. A large number of ladies, both from the city and adjoining country, were present at these special sessions. The subject of "Grading Grain" proved to be one in which the farmers were alike unacquainted and one which was of vital importance. The discussion on this and other topics suggested by papers presented at the Institute was one of its best features. The music was good, and the local city papers furnished excellent reports of each day's proceedings.

LIVINGSTON COUNTY—HOWELL.

The splendid court house here is an exceptionally good one to talk in. A Farmers' Institute is not a new thing in Livingston county. They were well up in all the questions that were discussed at Institutes. The officers were devoted to their work, and upon all questions they were ready and able debaters. The interest was well distributed between cows, sheep, horses, pigs and chickens. The farmers emphatically follow mixed husbandry. Long wool sheep had more friends than the fine short wool, or else the long wool men were more ready to defend the sheep of their choice. It is one of the counties where the Institute manager need not be afraid of selecting the wrong subject, for they seem to be deeply interested in all that pertains to the farm, the home and the crops.

MACOMB COUNTY—MT. CLEMENS.

The Institute at Mt. Clemens was held in a large and commodious hall. So far as the attendance was concerned, it was something of a disappointment; but so far as the interest of those who attended and the excellence of the limited papers presented was concerned, it was all that could be desired. One session was well attended by the farmers who came in from the surrounding country. Others were attended by a few farmers, but by a fair audience of city people. A few very intelligent and deeply interested farmers came in from the remote parts of the county and remained through all the sessions. Circuit Judge Eldridge deserves special mention for the interest taken. There is a high degree of intelligence among the farmers of Macomb county, but it requires Farmers' Institutes or other organizations to bring it into activity. They largely follow mixed husbandry in that county.

MANISTEE COUNTY—BEAR LAKE.

The attendance at this Institute was drawn from probably larger territory than any other at which we were present during the winter, several coming over thirty miles, and that regardless of the fact that the meeting was held seven miles from a railroad. The president, Mr. George W. Hopkins, was well adapted to the position. He kept the speakers well confined to the subjects under discussion, and saw to it that the program was carried out promptly. The light soils and rather hilly condition of Manistee county made the "good roads" question rather important. The fertilizer question, and what forage crops to grow, are the questions of the near future for this section, and along these lines we believe is the important work for succeeding Institutes. At this Institute we met women who could do the best talking back in meeting of any place that it has been our fortune to visit. Nor was there any lack of well informed talkers among the men, which made all the sessions very interesting. These people appreciate the value of the Institutes.

MARQUETTE COUNTY—MARQUETTE.

This was the first Institute ever held in Marquette. While the county is very largely devoted to mining interests, yet some very good farming lands are found in certain sections. The percentage of farmers to the total population of the county is small, and we suppose that this, in a large measure at least, explains why so few farmers attended the Institute. The hearty support given the Institute by the residents of the city of Marquette was highly commendable. Especial interest in the following subjects was manifested: Fertilizers, potatoes, small fruits, dairying and poultry. The surprise manifested at the exhibit of farm and garden products which was made clearly showed that there were possibilities in Marquette county resources which were not generally known.

MASON COUNTY—LUDINGTON.

In this section of the State, where the interest in peach growing is rapidly increasing, a good deal of attention was paid to that promising industry. The local speakers did their part most excellently, and a great many interesting and new points were brought out in the discussions both on fruit growing and general farming. The Institute labored under a disadvantage of not having a secretary who was able to be present at the session. It was unfortunate also that the young people of the vicinity had not been interested in the programs by invitation to take part either in the line of music or papers of general or local interest. Through some mischance the attendance from the eastern and northern part of the county was limited to one or two persons. The Institute as a whole is to be commended for the excellent attitude of the people, their anxiety to learn and the skill of the presiding officer.

MECOSTA COUNTY—BIG RAPIDS.

This Institute was held in the court house. The court room was an unusually good one for the purpose. Every comfort and convenience were provided for. The president and secretary were well up in their work. The attendance at the opening meeting was fair and increased with each session. While there was a prevailing discouragement because of the effects of the drouth in the summer and the low price of the only good crop they had—potatoes—yet the enthusiastic attention gave high hopes for the future of Mecosta county. The interest on the part of the farmers as well as the citizens of Big Rapids seemed to be universal. A delightful harmony between city and country was apparent. An earnest desire to develop the farmers as well as the farm was evident here. The interest was more concentrated on fruit raising, dairying, and potato raising, than on other branches of agriculture. The local papers were of high merit. This was especially true in relation to the one upon dairying and the one upon general farming.

MENOMINEE COUNTY—STEPHENSON.

The dominating feature of the Stephenson Institute was the admirable exhibit of products which completely filled a large hall. It was well managed and classified, and furnished object lessons for every session of the Institute. The program and offerings of premiums, and all the preliminary announcements concerning the Institute, its officers, the characteristics of the town in which it was held, and other facts of general interest, were embodied in an interesting pamphlet freely distributed during the meeting. The officers of the county society did their work admirably and were in attendance constantly to render any needed assistance. The discussions were not as full as they ought to have been, because of the tendency to refrain from asking questions. The attendance was large and continuous. The music for the occasion had been well arranged and added greatly to the pleasure of those in attendance. There was a little difficulty in beginning each session promptly because of the attractions of the exhibit, but there was no lagging in the program, and the local speakers kept well to their texts and within their allotted time. We would suggest that another year a special committee should have for its duty to introduce the people of the vicinity to the visiting lecturers, that those who have questions in mind to propose can be given a good opportunity to converse with the Institute worker and thus add to the value of the Institute season.

MIDLAND COUNTY—MIDLAND.

Midland is surrounded by a very good agricultural section. That the committee in charge of arrangements had done well was clearly shown in the large attendance at the opening session, the well prepared hall. and in all arrangements connected with the Institute. Great interest was taken in all papers and talks. As soon as discussion was called for some one was ready at once to open. There was no time lost and all was profitably taken up. Midland has had several previous Institutes and the people know how to conduct one properly and to get the most good out of it. The Institute held here was one of the most successful attended during the season.

MISSAUKEE COUNTY—LAKE CITY.

This Institute was the first one ever held in Missaukee county. The county is new and the farmers scattered. There is a great deal of good land, yet the people have hardly emerged from the use of the cant hook to that of the plow. There had been here a decided lack of knowledge in regard to what an Institute is, some going so far as to say that it was merely a political machine. In fact, the Institute was established only through the efforts of two or three level-headed and earnest men who fought against this spirit of conservatism. The Institute itself was not largely attended, but those who came were thoroughly awakened to the realization that an Institute is a good thing. If we do not have an average attendance at the next Institute of 100 to 125 each session, we shall be very much disappointed.

MONROE COUNTY—PETERSBURG.

The large attendance, excellence of local papers, deep interest in all the proceedings, practical experience in the matters treated, and efficiency of the local committee of entertainments at the Petersburg Institute, combined to demonstrate the value of the local grange and farmers' clubs in the education of a farming community. Fruit growing is a comparatively new industry, but is rapidly developing, and received its full share of discussion. A great deal of attention was also paid to the topics of butter making, grading grains, and treatment of soiling. Notwithstanding the almost continuous downpour of rain, the attendance and interest were remarkably good.

MONTCALM COUNTY—STANTON.

On account of a very severe ice storm on the opening day of the Institute at Stanton, the attendance throughout was poor. The interest in the meetings did not seem to be so general as at most other points. The papers were all good and the ground was well covered in the discussions, but the criticism might perhaps be made that too few took part in the discussions. Evidently the recent hard times have been felt more by the farmers of Montcalm county than by their neighbors in adjoining counties. With better times a more healthy tone would have pervaded the meetings, which were very profitable as it was.

MUSKEGON COUNTY—MUSKEGON.

This Institute, like many of the others, was marked by increasing interest from start to finish, and although the attendance was only average, there was not a dull hour during any session. Potato cultivation, peach growing, tillage, and irrigation, received particular attention, and almost every paper was followed by helpful discussion, often pointed and even pungent, but always good natured and beneficial. The subject of small fruit culture, which was touched upon only incidentally, seemed to appeal to a large number of those present, and some regret was expressed that more time was not allotted to it. The interest felt in the Institute work was well shown by the presence of several farmers who had driven twelve, fifteen, and in one case twenty miles, to attend the meetings, and declared themselves more than paid for their trouble. A most cordial welcome was given to all comers, the utmost good will prevailed through the sessions, and the entire management of the Institute was most commendable and successful. Such meetings as this cannot fail to give the people of the county a better knowledge and appreciation of the work of the State Board of Agriculture, the Experiment Station and the Agricultural College, and foster a spirit of candid inquiry and kindly criticism which must bear wholesome fruit eventually for all concerned.

NEWAYGO COUNTY—FREMONT.

This was, all things considered, a success, although the president, Mr. Hilton, did not deem it wise to begin work on the regular program until the afternoon session, which of course crowded us for the balance of the day, but this seemed unavoidable on account of the slim attendance, many of the people having long distances to drive. But this lack of attendance in the morning was made good by a full attendance during the remainder of the meeting, and the enthusiasm manifest made it a pleasure to conduct the Institute. Nearly all the scheduled local speakers were in attendance and their articles were interesting and well received. The State workers were plied with questions until, owing to lack of time, the chairman was obliged to call a halt and proceed with the program. Subjects relating to fruit growing seemed to attract a large share of the interest, though dairying and other general topics were given their full share of attention. The woman's section conducted by Mrs. Mayo was a great success, and right here I wish to say that the grange is doing a splendid good work in this county, and it was noticeable that very many of the most able and enthusiastic members and attendants of this meeting were members of some of the granges. Let the good work go on, the Institute and the grange hand in hand. During the progress of the meeting a local Institute society was organized, and a large number of members secured. The society is in good hands, and, judging from the interest in this, the first, the next Institute in Newaygo county will be one to be remembered.

OAKLAND COUNTY—PONTIAC.

A feature of the Institute at Pontiac was an exhibit of farm products; this was only a small exhibit, but it was helpful. We can see no good reason why such an exhibit on a more extended scale would not be a valuable educational feature of a Farmers' Institute. Oakland county was no exception to the general rule, that the Institutes were greatly strengthened by the timely aid of graduates and present and former students of the Michigan Agricultural College. Owing to some disappointments in securing proper material for the woman's section, this part of the Institute was not so successful and popular as it was in other places.

OCEANA COUNTY—HART.

The Institute opened on a cold and stormy Monday morning, but by noon the court room where the meeting was held was well filled. As Hart is in a section where the principal industry is fruit raising, the interest was good along lines that in any way related to that subject. Among the most commendable features of this Institute were the endeavors made by the officers of the local Institute association to interest the farmers and secure their attendance. The success was so great that at the time of the election of officers for the next year, all but one of the townships had representatives present. At noon each day dinner was provided at one of the restaurants for all from outside of the township. At this Institute the committee of arrangements added much to the attractiveness of the court room by tastefully decorating the walls and rostrum, and by the exhibits of fruits, flowers, vegetables and grains which had been secured.

OGEMAW COUNTY—ROSE CITY.

This was the first Farmers' Institute held in the county, in a new village at the end of a new railroad. One would expect to find matters in crude shape for holding an Institute. On the contrary, a good hall was provided, the advertising had been well distributed, and as a matter of course, the people were eager to attend and participate. The opening address by the Hon. A. S. Rose was a model of its kind. The papers presented by local talent were all good, and two of them, that of C. J. Phelps on "Potato Culture," and one by Mrs. Adelaide Schick on "The

Education of Farmers' Boys," were of unusual merit. Invitations had been extended to the farmers to bring in samples of farm products, and pecks of almost impossible potatoes, strings of ears and stalks of corn, and various samples of grain of excellent quality, were exhibited. A fine quality of sorghum syrup was passed around, and each taster was handed a splint of fine grained wood to sample it with. If succeeding farm meetings are as successful, Ogemaw county will gain an enviable reputation for its soil and its citizenship.

ONTONAGON COUNTY—ONTONAGON.

The Institute had a very small attendance of farmers. This was largely due to the weather. The week of the Institute having fine weather, had been preceded by cold and snow, and farmers were interested in gathering crops and could not be induced to leave their work. This suggests the idea of holding Institutes in the upper peninsula earlier in the season, say the last of September or first of October, anticipating at that time better weather than a month later, and a more convenient season for people to get out to such meetings. Ontonagon county has a great deal of good farming land in the valleys, and all kinds of roots, grass, and some fruits grow to perfection. The Institute was well advertised, and the speakers were well received. The evening meetings were well attended by people from the city. Much credit is due Mr. Jas. E. Crooker, president of the Institute society, for his energetic work in arranging for the meeting, and also for his work during the meeting. We think future Institutes held at Ontonagon will show greatly increased attendance and much greater interest than was manifested at this, especially if held earlier in the season.

OSCEOLA COUNTY—EVART.

Osceola county has had a number of Institutes previous to this year, and the people knew how to take hold, yet it cannot be said that the audience was an enthusiastic one, though they were interested and took a very intelligent part in the discussions. The most interesting topic appeared to be that of potatoes, which is the staple cash crop in this county, and this in spite of the fact, as Mr. Cowdrey says, "that money that was in potatoes this year is still *in* them." Osceola county has a class of people and a farming country that ought to insure not only a larger meeting, but a very enthusiastic one. A suggestion to the management would be that the Institute be thoroughly advertised during the early fall and winter.

OSCODA COUNTY—MIO.

In the afternoon of November 16, the log train on the Lewiston & Au Sable R. R. dropped us off at a crossroad in the woods. From here, after a drive of several miles through clearings and plains, we arrived at the village of Mio, the county seat of Oscoda county. The village is beautifully situated on the banks above the Au Sable river. The country around Mio is both hardwood and plains. The people came to the Institute for miles around, and we were surprised at the number in attendance and with the interest taken in the papers and talks. The chairman and secretary had evidently done some "hustling." From Mio we had a stage drive of thirty miles over the plains to the railroad station.

OTSEGO COUNTY—GAYLORD.

Gaylord is an enterprising northern Michigan town situated in an excellent belt of hardwood land. This meeting was the first State Institute held in the county. The details had been well worked up by the local committee and an interesting time was had. The principal crop grown by the farmers in this vicinity is the potato, for which their soil is particularly adapted. The very low prices realized by the growers (6 to 8 cents per bushel), have left little money for the season's work. Fruit and stock received a good share of attention, and many present expressed a determination to pay more attention to these lines in the future. The meeting closed with resolutions to make the next Institute even a greater success than the one just held.

ROSCOMMON COUNTY--ROSCOMMON.

Every citizen of the town and every farmer from the surrounding country united in making the Institute a marked success. Disregarding the time honored custom of holding Institutes in the court house the audience assembled in the opera house, which was comfortably filled during the day sessions and provided "standing room only" for many each evening. The program was carried out in its entirety. The preliminary work of providing the speakers, arranging for the music, and most important of all, advertising the fact that there was to be an Institute and that all farmers and progressive citizens should attend, was thoroughly well done at this point. We visited the farms of Messrs. J. H. Sly and A. D. Wayne on the uplands west of town, and were shown a large variety of the finest potatoes, some grown on soil just being subdued. A field of rape sown in corn still showed a rank growth after being fed over by a flock of sheep.

SAGINAW COUNTY—SAGINAW.

It was the misfortune of this Institute to be held in a city. As a result of this circumstance, the attendance was discouragingly small, and the per cent of farmers in the meagre audience was still smaller. The local speakers were well prepared and the interest in the subjects of the dairy and soil work was most excellent.

SANILAC COUNTY—SANILAC CENTRE.

It is generally agreed by all who have been in attendance at the Sanilac county Institute that the society has done much good in promoting the interests of the farmers of the county. There is not by any means the same unanimity of opinion in the suggestions offered as to how the association can best serve its members in the future. There were many inquiries for instruction in all branches of dairy work. We believe that in the future special efforts should be made to make the association as large and powerful as possible and to keep its work entirely and irrevocably in the control of the agriculturist. Hold the meetings for advancement, the exchanging of experiences and broadening the many new enterprises, of which so many are in this county undeveloped.

SHIAWASSEE COUNTY—CORUNNA.

The meeting did not open as auspiciously as could be desired. The large hall could not be warmed for the early first day meeting, so the court house was hastily prepared, and the first session held there, with light attendance. The hall in the afternoon was well filled, with increasing numbers to the close of the Institute. There were five topics for discussion on the program for each afternoon meeting, among them this, "Should Farm Buildings have name of Resident thereon?" This was discussed, and the members of one of the farmers' clubs decided by vote to thus designate their farms, and give a name to the premises. Some of the other questions were not so germane to the occasion, and they aroused considerable party spirit and rancorous discussion, unsuited to a Farmers' Institute. The papers presented by local talent were of no ordinary merit, and showed training in the clubs and granges of the county. The attendance from long distances was quite marked and the enthusiasm for Farmers' Institutes was thus widely scattered through the county.

ST. CLAIR COUNTY--PORT HURON.

The prophecy for this Institute, predicted upon some of the former ones, was discouraging. Port Huron is not the center of farming communities—is a large city, in which Farmers' Institutes, generally, languish. The forebodings were all dispelled on entering the large hall where the Institute convened. The hall was filled to the doors at every session with an enthusiastic and very intelligent audience. Much of the success of the meeting was due to the active labor of the president of the local association, Charles S. King, and the zeal of the secretary, L. B. Rice. The business and professional men of the city also interested themselves in the success of the meeting, and invited the attending farmers to a banquet in the afternoon of the last day. The efficient manner in which President King presided rendered the services of conductor almost unnecessary. Under such wise supervision, I believe the duty of conductor should be advisory, rather than to assume control. The management of the next Institute in St. Clair county is in safe hands.

ST. JOSEPH COUNTY—CENTREVILLE.

At Centreville the attendance was smaller that at most of the Institutes in that part of the State, but those present seemed greatly interested and were well repaid by the results of the Institute. Although the dairy interests of that section are not large, the talks upon "The Dairy Herd," and "Making Good Butter" attracted considerable attention, as did the papers by Mr. Austin of Florence and Mrs. Fonda of Centreville. The address of Prof. Holdsworth on "Art on the Farm" brought out many questions and was very interesting to the ladies. The papers upon "Poultry and Swine Raising" and on the "Cultivation of the Potato" were along the lines that seemed of particular interest to those present. While wheat has not proven a profitable crop for the last few years, it was the general opinion that it could not be dropped from the farm rotation.

TUSCOLA COUNTY—CARO.

At Caro was held one of the best and most largely attended Institutes of the season. The large audience room was full when the first session called to order. It is quite unusual to have so large a number present at the opening. The meeting all through was well conducted by the officers and the strong interest kept up to the last. The program was too full to give the time necessary to get the best out of the topics discussed. The woman's section, under charge of Miss Sill, was well attended by the ladies, and much interest manifested in the talks on cooking. Tuscola county had a most successful Institute.

WASHTENAW COUNTY—YPSILANTI.

The Institute was held in Cleary Hall. Local speakers did much to increase the interest of the farmers and general public as well. Some very fine papers were given, and the farmers of this section seemed awake to their best interests. Would that every county in the State could boast of so many instructive and entertaining speakers. We regret that more of Washtenaw farmers' families were not present, although the attendance was good.

WAYNE COUNTY—WAYNE.

This Intitute was conspicuous for two things, the large attendance and interest on the one hand, and the quick, keen, and intelligent discussions by the local speakers and on the part of the audience. The secretary had done his work well and the intelligent community responded enthusiastically. It would be hard to identify any subject as of greater interest than others, or one more intelligently discussed. At one session the small fruit men were in the ascendency, at another the dairymen took the lead. As a whole the Institute was almost an ideal one.

WEXFORD COUNTY—CADILLAC.

This Institute was fairly well attended. The officers of the Institute were prompt and faithful. The local papers were excellent. The country about Cadillac is new and the farms not yet fully developed—they are to quite an extent in a transition state between lumbering and agriculture. A Farmers' Institute had not arrested the attention of the bright, active business men who have made Cadillac what it is, to the extent that it deserves. Splendid provisions were made for the entertainment of Institute workers as well as for a commodious room in which to hold the Institute.

NOTES ON MICHIGAN INSTITUTE WORK.

We had hoped to give quite a full account of the various phases of our Institute work in Michigan, but space forbids it in this bulletin. We shall content ourselves with mentioning a few of the features that have been made prominent during the past winter.

At the outset I wish to acknowledge the assistance from the various hotels and from the Michigan Passenger Association of the State. At many of the hotels we were able to secure reduced rates, and the Michigan Passenger Association granted our workers half rates while engaged in Institute work. This made a great saving in our expense account and enabled us to do much more extensive work than we could otherwise have performed with the amount appropriated.

THE LONG INSTITUTE.

The program of this Institute appears in another portion of the bulletin. It will be noticed that the idea of the Institute is that of a school, in this case a school of horticulture. Each lecturer came on the program at a certain hour on each of the four days, and the arrangement of his topic was, as near as could be, in a sequence. Thus each lecturer was enabled to cover his subject with a much greater degree of thoroughness than is usual at Institute meetings. As an illustration of the method, we have published in this bulletin Mr. Roland Morrill's lectures on the peach. Mr. Morrill is authority on this subject, and it is safe to say that this series of lectures is one of the most complete and authoritative extant. The other lectures were of the same order of thoroughness and completeness. This long Institute was, in every respect, a success, and, while it was largely an experiment in Michigan, it will undoubtedly be continued and enlarged.

MECHANICS' SECTIONS.

At Bay City, Saginaw, and Battle Creek, the Mechanical Department of the Agricultural College, under the charge of Prof. C. L. Weil, and assisted by Prof. Chamberlain and Messrs. Wescott and Newell, conducted an evening session for the young mechanics of the city. At the "round-up" at Grand Rapids two evenings were devoted to this work, Secretary Ward of the Grand Rapids Y. M. C. A. managing the affair locally, and allowing the meeting to be held in the audience room of the Y. M. C. A. building. This was wholly a new thing in Michigan, and, while not strictly in line with work for farmers, is entirely in line with the purpose of the Agricultural College in its Mechanical Department. The meetings were considered a success.

INSTITUTE SOCIETIES.

We believe that one source of strength of our work in Michigan is the organization of a Farmers' Institute society in each county of the State which has an Institute. The work is thus given permanence, and the societies may be utilized for many other lines of related endeavor. Summer meetings, of a picnic nature, and frequent one-day meetings in various parts of the county are encouraged and in some cases are being carried on. We offered to members of Institute societies, this last spring, the opportunity of performing some experiments in conjunction with the Agricultural College. The following is a copy of the circular sent out to secretaries on this subject. Quite a number of farmers in various parts of the State availed themselves of this opportunity:

COÖPERATIVE EXPERIMENTS.

To Members County Institute Societies:

Everybody acknowledges that a Farmers' Institute is a good thing, but where an Institute occurs only once a year, those who attend are very apt to lose interest during the busy season. With the purpose first, of interesting more farmers in the county Institute work, as well as keeping up the interest of those already members of the county society, and second, of trying to induce practical farmers to try various experiments in an accurate way, an arrangement has been made by which members of county Institute societies all over the State may perform certain experiments during this present growing season, in coöperation with the Farm and Horticultural Departments of the Agricultural College. Of course the experiments suggested will not meet everybody's needs, but we thought it better to have four or five experiments carried on all over the State than to scatter our energies on a large number. If carefully performed, these experiments ought to be very valuable in showing results from all sections of our great State.

Those who may think that these experiments are not sufficiently broad will remember that this whole scheme is but an experiment. If we succeed in interesting a large number of farmers the work can easily be extended. Moreover the experiments given are of interest to people in almost every county in the State, and are on subjects about which *hundreds of questions are asked* at Institutes and in letters to the Agricultural College.

RULES.

The rules we make are very simple.

First, The experiment should be performed by a paid-up member of the county Institute society or by a member of his family.

Second, The experimenter is asked to make a brief report to the Agricultural College. Also to write up the results of his experiment in a paper that will not take over five minutes to read, and read it or have it read at the Institute held in the county next winter. If county societies take hold of this matter in good shape, we can have a most interesting session given up to the reports from these experiments and a discussion of the same.

Third, Wherever possible, the experimenter is to make an exhibit at the Institute of the products grown under these experiments.

THE EXPERIMENTS.

NO. 1. CULTIVATION OF CORN.

It is suggested that experiments be tried in the cultivation of corn in the following lines, using at least one acre for each plat or section:

(*a*) Harrow the ground, after planting, with a fine-tooth harrow, beginning before the corn is up and continuing at intervals of at least every five days, until the corn is too high to use the harrow without injury to the corn. As opposed to this method, cultivate a plat or section with the ordinary cultivator in use, beginning after the corn is up so that the rows can be seen. Follow this cultivation on one section with a one-horse cultivator set to run at a depth not exceeding two inches, and continue this through the season, never going more than two inches in depth, and taking special care to cultivate immediately after a rain as soon as the soil is dry enough to work. Cultivate a second section four inches in depth, continuing through the season, and without being particular as to cultivating after rains, simply keeping the soil mellow and killing weeds. Use, if possible, at least one acre of land for each section and note accurately the difference in growth and yield.

(*b*) We would suggest also a trial of early and late plowing for corn. Plow one section as early as possible and keep it well harrowed until planting, and plow a second section and plant immediately, planting both sections at the same time and cultivating both in the same manner, through the season.

NO. 2. GROWING RAPE FOR SHEEP.

Growing rape for feeding sheep has been tried to some extent and it has usually been found valuable. Rape belongs to the cabbage family, the stems and leaves being the part eaten by stock. It grows to the height of two to two and one-half feet, and the stems have a large supply of leaves. It requires a soil similar to that adapted to cabbage or turnips. It can be sown in drills about twenty inches apart, sowing one and one-half pounds of seed per acre, using an ordinary turnip drill. It can also be sown broadcast, using six pounds of seed per acre, which may be sown with the wheelbarrow seeder and covered with a light harrow. If the land is weedy, it is best sown in drills, and for experimental work it is probably best to sow in this way. It does not need thinning, but should be cultivated or hoed until it gets a good start, when it will outgrow the weeds. It should be sown about the last of June on land that has been plowed a month previous and well cultivated several times previous to the time of sowing. It is fed by turning the sheep in the field where it is growing, and will be ready for use about the middle of September, and the sheep can be fed on it until hard freezing and snow. When sheep are first turned in, care should be taken to give them a full feed of dry feed just previous to turning in middle of afternoon, as it will cause bloat otherwise. Sheep or lambs will fatten on this plant with no other food.

The variety to sow is the Dwarf Essex, and *only this variety should be tried.* The seed can be obtained of D. M. Ferry & Co., of Detroit, and probably of other seedsmen. Be particular about the variety. The expense is very small, as the seed should be obtained at retail at a cost of not over fifteen cents per pound.

NO. 3. SALT AS A FERTILIZER.

As an experiment in a fertilizer for light soils, we would suggest that you try salt, which can be obtained by the ton very cheaply at the various points where salt is manufactured. Use it quite liberally, say 400 or 500 pounds per acre, sowing broadcast, and note the difference, if any is observed, of growth and yield on plats sown with salt and those adjacent not sown. I would suggest that a field be sown in alternate sections of an acre each, leaving alternate plats without salt, so as to make the comparison easy.

Reports to the College on all of the above experiments should be made to Prof. Clinton D. Smith, Agricultural College, Mich.

NO. 4. POTATOES.

(*a*) A variety test. The College will supply one pound of each of ten new varieties to such county organizations as will agree to have them grown according to directions which will be sent with the seed, and to make a report at the end of the season. *Those wishing to perform this experiment should send immediately to Prof. L. R. Taft, Agricultural College,* stating that they wish to perform this experiment and certifying that they are paid-up members of a county Institute Society. The supply of this variety is limited and you will have to apply at once if you want to perform this experiment. The products of this experiment should be exhibited at the Institute next winter with a record of the yield. Report should also be made to Prof. Taft.

(*b*) A test of the amount of seed. One-eighth acre (or other area as may be determined upon), should be planted, using whole potatoes about twice as large as a hen's egg. Another plat of the same size should be planted with potatoes of the same size cut lengthwise. A third plat of equal area should be planted with whole potatoes the size of a hen's egg. The variety used should be one commonly grown by the experimenter. The crop should be carefully measured or weighed and a report made to Prof. L. R. Taft, Agricultural College, stating the name of the variety, the character of the soil, and the distance of planting. A similar report should also be presented at the next winter's Institute, and also an exhibit made of the yield of one square rod.

(*c*) A test of hill and drill planting for potatoes. We would suggest that one plat of ⅛ acre be planted 3x3 feet, and another of the same size in drills, the rows three feet apart and the seed planted eighteen inches apart, the same amount of seed to be used per acre as in hills. It would be desirable to have this test made with two varieties, one having a large top and the other a small one. Observe the same directions as to harvesting, reporting and exhibiting as in the case of experiment *b*.

GENERAL SUGGESTIONS.

1. Be sure to be very accurate in all measurements and in all observations. It will be convenient if you have a note book especially for this experiment and note down observations which you have incorporated into your written report.
2. We suggest that as a rule, each person take *some one experiment, and perform it thoroughly.*
3. We believe that a careful following of the suggestions will get best results. The great advantage thus gained will be that of uniformity, every one working under the same conditions in every county of the State.
4. Do not forget to write up the results in a five minute paper for the Institute so that it can be read in case the experimenter is not present. We have asked the secretary of your county Institute society to send us your name and address, together with the experiment upon which you are working. If we receive this information, we will try to send you bulletins from this and other states, bearing on the experiment you are working on.
5. We suggest that in some cases one of these experiments be given to a younger member of the family who will do careful work, and who will make correct observations. This will encourage the boys on the farm.

Trusting that these experiments will inure to the benefit of the agriculture of Michigan, I remain,

Yours respectfully,

KENYON L. BUTTERFIELD,
Superintendent.

STATE FAIR PREMIUMS.

The Michigan State Agricultural Society consented to an arrangement by which they offered premiums to county Farmers' Institute societies for making certain exhibits at their State Fair in Grand Rapids, September 7-11, 1896. The following is a schedule of these special premiums, with rules governing the same:

Special premiums for exhibits by county Institute societies at Michigan State Fair, at Grand Rapids, September 7-11, 1896:

No. 1. Best exhibit of fruit. Premiums: 1st, $15; 2d, $10; 3d, $5.

No. 2. Best exhibit of grains and grasses. Premiums: 1st, $15; 2d, $10; 3d, $5. This should include grains in straw as well as seeds of both grains and grasses.

No. 3. Best exhibit of vegetables. Premiums: 1st, $15; 2d, $10; 3d, $5.

No. 4. Best exhibit of maps, charts, characteristic soils, and other material showing the resources of the county. Premiums: 1st, $10; 2d, $5.

RULES.

Rule 1. Exhibits Nos. 1, 2, and 3 must be grown, and exhibit No. 4 prepared, by fully paid up members of a legal county Institute society, and accompanied by a certificate of this fact, signed by the secretary of the Institute society making the exhibit.

Rule 2. All exhibits must be properly and conspicuously labeled.

Rule 3. All exhibits not accompanied by a person will be put up by society.

Rule 4. All exhibits must be shown together, *i. e.*, all fruit together, vegetables together, etc.

Rule 5. Entry to be made by secretary county Institute society. Entries close September 1.

Rule 6. Quality and variety to count with judges, rather than quantity.

Rule 7. No county shall have more than one entry in each exhibit.

WOMAN'S WORK.

The woman's work at Farmers' Institutes the past season was of two kinds. One was performed by Miss Margaret M. Sill, of Detroit, who attended the Institutes at Pontiac, Adrian, and Caro, spending two afternoons at each Institute in a session for the women, in which she gave demonstration lectures in cooking. She also gave a lecture before the woman's section in the "round-up" at Grand Rapids. Miss Sill reports as follows in regard to the work formed last winter:

"At Caro there were 75 the first day and over 100 the second. At Adrian the first day there were over 200, and on account of the weather about 50 the second day. At Pontiac there were about 60 the first day and 40 the second.

"I found the greatest interest shown for this work in all the places I was at, and particularly at Caro and Adrian. The ladies seem to desire this work and to my mind it is one of the most important parts of Institute work. Last year I heard from two sources of those who had gone on with the work, simply through being interested at the Institutes the year before, and in one case the girl had earned quite a little towards her support by this work. As far as I could judge from talking with the people and from the interest shown for the work, I would advise a great many of these lectures this next winter. I speak from an entirely disinterested point of view now, and particularly in places away from the large cities. There certainly is a large field for this work and I do not think it can be overlooked now."

Yours very truly,

MARGARET M. SILL.

The other line of work was performed by Mrs. Mary A. Mayo of Battle Creek, who attended twenty Institutes, besides the "round-up" meeting at Grand Rapids, and held a woman's section one afternoon at each Institute. The attendance at these sessions, as reported by Mrs. Mayo, is as follows:

Kalkaska, Kalkaska county	100	Fennville, Allegan county	180
Cadillac, Wexford county	69	St. Joseph, Berrien county	380
Lake City, Missaukee county	75	Hastings, Barry county	200
Luther, Lake county	50	Cooper, Kalamazoo county	240
Evart, Osceola county	90	Battle Creek, Calhoun county	450
Big Rapids, Mecosta county	200	Cassopolis, Cass county	250
Frankfort, Benzie county	250	Centreville St. Joseph county	250
Fremont, Newaygo county	350	Coldwater, Branch county	350
Hart, Oceana county	300	Jonesville, Hillsdale county	250
Muskegon, Muskegon county	250	Dansville, Ingham county	200

This makes a total attendance of over 5,000 women at the special sessions of these twenty Institutes. Besides that there were 825 at the three sessions of the woman's section at the "round up" meeting, and about 500 at Miss Sill's meetings. Thus nearly 6,500 women were in attendance at the various woman's sections of the Farmers' Institutes in Michigan the past winter. Mrs. Mayo was entirely satisfied with the attendance and the interest manifested. Mrs. Mayo's talks at these woman's sections were two: first, "Making Housework Easier," and second, "Mother and Daughter." Both of them appear in the report of the woman's section of the Round-up meeting. The woman's section, as conducted by Mrs. Mayo, is entirely new to Institute work in Michigan, and probably to Institute work in the United States. We have therefore taken some pains to discover what the women of the farms think of the innovation. We sent out questions to the various counties where Mrs. Mayo had worked, as follows:

1. Did the women who attended the woman's section at your last Farmers' Institute feel profited by the sessions? Have you heard comments on it since the Institute?
2. At a future Institute in your county would it be desirable to have a special woman's section? Would your ladies want to hold one even if we could not send a lady by State help?
3. What were the chief benefits that came from the session, and what suggestions have you for improving it?

The following are some of the replies:

Mrs. John Hollenbeck, Berrien county: "I have heard the woman's section well spoken of. I attended at St. Joseph and was very much pleased."

Mrs. A. M. Brown, Kalamazoo county: "I considered our woman's section a decided success, and think the same plan should be carried out at our next Institute, with or without State aid."

Lucy A. Rikerd, Lake county: "Our ladies expressed themselves as pleased and profited by the meeting. I think it would be desirable to have a special woman's session at another Institute. I think our ladies would carry on the matter, even if the State could not send help."

Mrs. Wm. T. Adams, Kent county: "The comments on our woman's section were many and very favorable. Some enjoyed the woman's section more than they did the general Institute, while others would prefer it all together. Personally, I would say that if the appropriation was short (with all due respect to the men), leave off two or three of the men but send Mrs. Mayo."

Mrs. Clement Smith, Barry county: "I think our women profited by the woman's section. I hear favorable comments. Have anything at these sections that will stimulate discussion and bring farmers' wives together, in a joint meeting with the women of the town. There will be benefit derived from listening to addresses of topics of practical interest to both."

Mrs. C. C. McDermid, Calhoun county: "The ladies were very much pleased with the session. I have heard nothing but commendatory remarks. I think the ladies would prefer to stay at the regular session rather than to try to conduct an Institute by themselves without State help. The woman's section was too short to allow any interchange of opinions. The necessity of leaving the main session out was a disappointment to many, yet I am sure that many resolves were made which, if carried out, will give purer, sweeter, higher, more confiding companionship in the home."

Mrs. Ida De Voist, Oceana county: "Mrs. Mayo's remarks were helpful to the home makers of our county. I would go so far as to favor the women holding separate sessions at the Institute at the same time at some other place, for the discussion of subjects promoting true home life."

Mrs. Geo. E. Woodward, Benzie county: "I am sure that women were greatly benefited. Many of Mrs. Mayo's subjects were talked over and discussed after the Institute. God bless Mrs. Mayo for her earnest efforts in behalf of the women."

Mattie A. Kennedy, Muskegon county: "Many of our ladies, I think, would have been better satisfied if we had not had a session separate from the rest. Holding a separate session is tacit acknowledgment of a separate interest, a thing which is death to a real farmer's home. I think Mrs. Mayo's methods and rules are not likely to be adopted in one home in ten, because they are too ideal. All could adapt something to their own special needs."

Mrs. L. L. Taylor, Kalkaska county: "I think it is impossible that any could have gone away without feeling profited, and the comments I have heard have all been favorable. We certainly want State help for a woman's section at another Institute. The great value was in the heart to heart talk, the getting together of our farm women, thereby creating a closer bond of sympathy and the free exchange of modes and plans of work."

Mrs. E. D. Nokes, Hillsdale county: "Every one I have met expressed themselves as very much pleased, one gray-haired mother saying, 'When I see these wonderful advantages coming to our young women, I almost wish I could begin my life over again.' Do not think of doing otherwise than of having a woman's section next year. State help would give the inspiration which always comes from recognized leadership, yet I think we have women of talent who would take hold of the work and make a section very profitable by themselves. I think it a good plan to bring the women of the city and the farm together on a common ground, to consider subjects of interest and helpfulness to both. Our women returned to their homes filled with a determination to carry more brain and less muscle into their every-day work. Give us more time and more help."

Mrs. F. W. Robinson, Allegan county: "Have heard a great many comments on the woman's section, and all seemed well pleased and profited. By all means give us another. Our women were much cheered and comforted by Mrs. Mayo's words on 'Making Housework Easier.' The only suggestion I have is, give us more time."

Mrs. J. D. W. Fiske, Branch county: "Although our woman's section was a success, yet I have heard many regret that they could not attend the general session at the same time. The lecture by Mrs. Mayo was extremely interesting and beneficial. In fact, the whole section was intensely interesting. Personally, I object to special sessions, since they seem to break up the home interests and foster that unhealthy condition of society of which the so called 'new woman' movement is the outgrowth. All members ought to be interested in all topics relating to the farm and the home."

Alice L. Allward, Osceola county: "Our women were delighted as well as profited by the woman's section. It was altogether too short. At future Institutes we want to stipulate that a similar meeting be held under the leadership of a competent woman. One of the many benefits is the putting before our women higher and better ideals of living, and the cast of thought which comes from the personal touch with those in sympathy with these ideals."

Mrs. R. W. Dickson, Mecosta county: "All our women with whom I have conversed felt profited by the woman's section. We think it would be desirable at future Institutes to have such sessions. They awaken great interest. Mrs. Mayo's talk on 'Mother and Daughter' was full of help to those having children. I would suggest that at another session the all-important subject of cooking should be discussed, and also the rearing of children."

Mrs. R. H. Wiley, Cass county: "Our ladies feel that they were greatly benefited by our woman's section, and speak in very high terms of Mrs. Mayo's work. All of them favor having another meeting. Mrs. Mayo's 'Mother and Daughter' was of more interest and importance to mothers than all other topics discussed during the Institute, and received the highest eulogies. I think that the general program should be arranged so that at the men's session the questions of the least importance to the women should be discussed at the time of the woman's section."

NEWSPAPER COMMENTS.

One of the most encouraging things about our Institute work in the past year has been the practical unanimity with which the newspapers of the State have supported the work. They have published notices of meetings, descriptions of the work of organizing, and in every way have advertised the Institutes. They have also given complete and valuable write-ups of the Institute meetings themselves. We take great pleasure at this point in acknowledging the helpful services of the newspaper men of the State. We also take the liberty of quoting freely newspaper opinions as to the value of our work. These are taken from papers mailed to us. Undoubtedly many other papers had similar comments which did not come to our office:

The Farmers' Institute at Howell, Thursday and Friday, was the most enthusiastic and best attended that has yet been held in the county. It was under the new law, several speakers being furnished by the State.—Livingston Republican, Feb. 5, 1896.

Dr. Beal, who had charge of the Farmers' Institute here this week, gave splendid satisfaction. Indeed, all the professors showed a familiarity with all the shades of scientific farming that won for them and the institution they represent the esteem and confidence of those in attendance. We are pleased to say that no one of them was more praised nor more acceptable than he who hails from our own county, Prof. Woodworth, of Caseville. The professor is always a welcome visitor to the county and his lectures are always listened to with pleasure. To this splendid corps of teachers is largely due the enthusiasm that prevailed all through the Institute sessions. We will be pleased to meet these learned gentlemen again under like circumstances.—Huron Tribune, Jan. 24, 1896.

It was emphatically a representative people which gathered together at the court house Monday morning in pursuance to a call for a Farmers' Institute, and the slightest glance would dispel any theory of a non-interest on the part of the farmers of this county. Every section of the county was represented, and the farmers' wives were a conspicuous part of the great assemblage.—Hart Journal, Jan. 17, 1896.

The Farmers' Institute is a rattling success. The attendance at the opening session was the largest seen at the same hour anywhere in the State. Ionia county against the world.—Ionia Sentinel, Jan. 23, 1896.

The Farmers' Institute at Dansville, under the auspices of the Ingham county Institute society, held in the M. E. church, Jan. 30 and 31, was an unqualified success in every particular. The attendance throughout was large, the house being well filled at every one of the six sessions. From start to finish the interest was marked. The help furnished by the State was all on hand, and each handled his subject with that plain, practical sort of a way that always impresses the hearer with the importance of the truths uttered. These Institutes cannot fail to be very helpful to the farmer in these times when his success must depend so largely upon his economy in management. The College bulletins, now issued regularly and sent to every member of these local societies, if read and heeded, will prove of untold value. It is a hopeful sign that each year our Agricultural College is adding to the number of its friends thousands of farmers from all quarters of the State. One of the most pleasing features of the addresses of the College professors was the absence of any spread-eagle oratory. Simply plain, practical talks, such as plain, practical people are always delighted to hear. The shower of questions fired at each speaker at the close of his address were unmistakable signs of interest in the subject under discussion.—Ingham County Democrat, Feb. 6, 1896.

The first Institute was a decided success both in attendance and in the interchanging of ideas that will be beneficial to all.—Hillsdale Standard, Feb. 4, 1896.

Ludington, Mich., January 8.—The Farmers' Institute held here during the past two days was largely attended by farmers and fruit growers of the county. Messrs. Graham and Stearns, expert speakers, discussed the question of peach growing and maketing all day yesterday, and answered scores of important questions. The peach men say the meeting will be worth hundreds of dollars to them.—Detroit Free Press.

The last night's session was one of the most interesting and best attended of the Institute. Too much cannot be said of H. W. Mumford, A. A. Crozier, and J. H. Brown, who were sent here by the State Board of Agriculture to assist in holding the Institute. They left the impression with those that attended that they were conversant with both scientific and practical agriculture. They will be heartily welcomed at the next meeting. The total attendance was in the neighborhood of 2,300 people, and the first meeting was a great success. The farmers throughout this section should be gratified over the results, and be proud that such an Institute was held in our city, and was so largely attended.—Marquette Mining Journal, Jan. 10, 1896.

At the close of the meeting held by Mrs. Mary A. Mayo, at the Congregational church, on the afternoon of January 10, and addressed solely to ladies, the following motion was made, supported and unanimously adopted by a rising vote: "We, the women of Newaygo county, wish to extend our heartfelt thanks to the officers of the State Board of Agriculture for sending to us this gifted Christian woman, Mrs. Mary A. Mayo."—Fremont News, Jan. 15, 1896.

Thus ended the best and most profitable Farmers' Institute ever held in Lapeer county or indeed in this part of the State.—Lapeer Clarion, Jan. 31, 1896.

The first session of the Iron county Farmers' Institute was pronounced a grand success by all, irrespective of whether they were farmers, business men or laymen. Many of those who only attended one or two of the sessions have since stated that next year, if they are in the land of the living, they will make a special effort to attend and participate in all the sessions. We believe the Institute has done much good for the people of this end of the county, and predict that next year's meeting will show a much larger attendance.—Iron County Reporter, Nov. 9, 1895.

The Farmers' Institute held in this city may be justly called a success. Large audiences greeted the speakers, who were evidently entertained and instructed. The professors from the Agricultural College showed a thorough understanding of the subjects they discussed and brought to the attention of the audience many useful as well as startling facts. Few, we imagine, were aware of the extent to which the adulteration of food had been carried until the State Inspector made his exhibit. If the ingenuity displayed by the dishonest mixers in imitating genuine articles of food, had been turned to honest purposes, how much better the world would be.—Ypsilantian, Feb. 6, 1896.

The Farmers' Institute held here on Monday and Tuesday, October 28 and 29, was a success in every particular, in exhibits, information, and attendance, and everybody who attended, including the lecturers, were more than pleased with the work accomplished. Even the weather clerk down at Washington took so much interest in the matter that he ordered two especially fine days for the Institute and many took advantage of the same to come and take a look at what may prove to be the entering wedge of the location of the county fair at this place, the best for the purpose, both geographically and otherwise. The exhibits that were brought in were generally fine and showed off to advantage the possibility of the soil in this part of the State. The live stock, while not so large as could be wished for, was also fine and created considerable interest. The woman's department was a gorgeous display of fancy and needle work and superb paintings, showing that among the ladies of the town are several true artists, who need not take a back seat for a more pretentious community. The school exhibits were numerous and represented work from several schools in this and Nadeau township, some of the specimens showing decidedly advanced studies, and the excellent educational facilities of the schools in this county.—Menominee County Journal, Nov. 2, 1895.

The Farmers' Institute, held at the court house, last Thursday and Friday, was an unqualified success in all things, except the numbers in attendance. The program, as published in the "Avalanche," was well carried out, only three of the local speakers failing in attendance. Our space forbids a fair resume of the papers presented, and our only regret is that every farmer in the county was not present, to gain new courage.—Crawford Avalanche, Nov. 21, 1895.

Those farmers who failed to attend the Institute are great losers. It was an opportunity they could not afford to miss, and we trust hereafter when these Institutes are held in the county, every live farmer in the county will make it a point to be present.—Cheboygan Tribune, Nov. 14, 1895.

The Institute now in session here is a pronounced success in all but one essential feature—the attendance is not what it should be. The Institute started out yesterday morning with a very small attendance of farmers, but has been increasing with each session. The men sent here by the Board of Agriculture have been and are doing their part of the work in an excellent and thorough manner; that its usefulness is limited is due only to the ones who have tried all along to depreciate the work, and the farmers who have been foolish enough to stay away. The evening session and the woman's section yesterday afternoon were well attended, and every farmer who attended the Institute freely acknowledges its value and will henceforth be enthusiastic in the matter. The workers have all done splendidly, and we cannot give the credit due each, but special praise is given Ex-Governor Luce, who gives to his hearers all there is and the best there is in him.—Missaukee Republican, Nov. 9, 1895.

In a mental review of the work of the State Farmers' Institute, convened in Big Rapids the past week, many suggestive thoughts arise, from which all may profit. The subjects chosen for discussion were all of the most valuable and practical kind; not only beneficial to farmers, but to the community in general, and as pertaining both to health and happiness. The speakers who addressed the large audiences brought the warmest enthusiasm into the work, and the resultant effects will reach far beyond the limits of Mecosta county, if not the State. Where all the speakers did so well, comparisons are invidious; yet perhaps a few had more happily chosen their subjects, and of those we may name Hon. Cyrus G. Luce, of Coldwater, R. M. Kellogg, the noted horticulturist of Ionia, and G. H. True, of the State Agricultural College. Their subjects appealed not only to the direct moral and financial interest of every farmer, but to the general welfare of every home in the land, and were received with approbation. As to a portion of our daily food, and its contribution to our health, the remarks upon fruit and its cultivation, by Mr. Kellogg, were especially pertinent. The gentleman is an enthusiast upon the subject of fruit, particularly berries, and possesses an easy and happy manner of never wearying his audience. The Institute has changed the location for its next meeting, but in view of the great interest manifested, we predict the attendance will be even greater in numbers.—Big Rapids Pioneer, Nov. 25, 1895.

The winter months just closing have been beneficial ones to the farmers, and especially to fruit growers and gardeners. The different Institutes and meetings for discussion of subjects pertaining to farm life have been largely attended and proved instructive. The desire which they have shown in nearly every case to attend these gatherings, indicate that they realize their value and importance, and that they will avail themselves of their benefits in the future, whenever possible.

without any special prompting. It should be so. The Institute system is a wise one. It is one of the most valuable instrumentalities we have for the dissemination of agricultural and horticultural information and improved methods. Those who have conducted these gatherings are deserving of praise for their labors.—Practical Farmer and Fruit Grower, Mar. 13, 1896.

The woman's section of the Farmers' Institute, tried this year the first time, has by its evident success proved its right to live, and must in future years be highly useful to farmer women and ladies generally.—Coldwater Sun, Jan. 30, 1896.

The work done in the Institute has been very profitable to those who were able to attend regularly and those whose business interfered were well repaid for the time spent in this direction. The attendance at all times was very good and unusual interest was shown in the proceedings. The gathering together of people from all parts of the county to attend such meetings is a good thing for the people, city, county, and everything concerned, as it fosters interest in the welfare of the community at large, and the interchange of sentiments, and the relating of experiences in the various lines of agriculture, gives others the benefit without the loss sustained in actual trial for themeselves.—Coldwater Daily Reporter, Jan. 30, 1896.

What with the lectures, addresses, papers and discussions all combined on objective points, the instruction of the farmer was well taken care of, and Bear Lake saw more genuine farmer enthusiasm and heard more sound farmer talk than ever before. The weather was exceedingly favorable, with good sleighing on all sides, not permitting of the accustomed excuse from the farmer who would like to see something in the weather to prevent him from attending and not ruffle his conscience for staying at home. The large attendance not only gratified but surprised the majority of the officers and promoters. From a comfortably filled hall on the opening morning, the audience grew larger than the seating capacity during the afternoon session and at night packed the hall to overflowing. An average of 400 was maintained right through. As for the enthusiastic manner in which the audience "took hold" in the discussions, and whenever proper, making the dryest subjects interesting, cannot be justly estimated in figures.—Manistee Times-Sentinel, Jan. 17, 1896.

The State Farmers' Institute which was held in this village Tuesday and Wednesday was the most successful gathering of the kind that has ever been held in this county, and we doubt that in the excellence of the papers read and the interest manifested by those in attendance that it has been exceeded by any Institute held in the State. Representative farmers were present from nearly every township in the county. Careful attention was paid to each paper read and the discussions were at all times spirited.—Bad Axe Democrat, Jan. 24, 1896.

Those farmers who failed to attend the Institute are great losers. It was an opportunity they could not afford to miss, and we trust hereafter, when these Institutes are held in the county, every live farmer in the county will make it a point to be present.—Gladwin County Record, Nov. 29, 1895.

The splendid attendance showed how interested the agriculturist is in his vocation, and every session was a credit, not only to the professors from the Agricultural College, but to the farmers of Branch county. This Institute demonstrated beyond question that the appropriation made by the State to help on the work, as here exemplified, is well expended, and it is doubtful if the State expends any equal sum for public purposes that as richly repays the State as the sum expended upon Farmers' Institutes.—Coldwater Courier, Feb. 1, 1896.

That the Institute has been a grand success, is evident from the number of earnest men and women in attendance at each session, the deep interest taken in the papers read and discussed, as well as in the questions asked and answers given. The interest in the attendants did not wane when they left the hall, for in stores, hotels, and on the streets could be seen groups of men and women engaged in earnest conversation about the proceedings of the Institute.—Alma Record, Jan. 31, 1896.

The value of these Farmers' Institutes is difficult to compute, as the seed sown in the Institute this week may lay dormant for many days, but its ultimate growth is a certainty, and, in proportion as the methods of the tillers of the soil improve, so will their conditions improve, and the day is not far distant when the producers will be taking their entitled place in the estimation of the people.—Barry County Democrat, Jan. 23, 1896.

The Farmers' Institute Tuesday and Wednesday was an unusually successful meeting, and the attendance was very large during both the day and night sessions. Every section of the county had representatives present both days, some of the farmers driving twenty-five miles. The interest manifested in the dairying lectures and the discussion of this most important feature of farming, demonstrated the fact that Branch county farmers are at last awakening to the knowledge that they must turn their attention to this profitable feature of farming or be driven from the farm by the low price of almost every other farm product.—Coldwater Republican, Jan. 31, 1896

First annual meeting of Marquette County Farmers' Institute was crowned with success. Nearly 2,300 people attended the six sessions. The three men sent here by the State Board of Agriculture thoroughly versed in both practical and scientific farming.—Marquette Mining Journal, Jan. 10, 1896.

The success of the Farmers' Institute must be highly gratifying to those officers of the local society who have worked so faithfully to make it what it has been. The attendance has been large, while the keen interest manifested proves the deep interest in progressive methods taken by our farmers and fruit growers. The discussions, no less than the formal addresses, have been thoroughly practical. Excellent ideas have been presented by men who have gained their knowledge in the college of experience, the university of the farm. The bright exchange of ideas from so many experts and intelligent observers will have a stimulating effect on all who have attended the Institute. Socially, too, it is a great benefit for all who have thus mingled together in these meetings. The farmers and the members of their families have met friends from other neighborhoods than their own and have thus helped to develop a more friendly interest. It has been good, too. to have this interchange of courtesies between the people of this city and their friends from the farms. Out of this Institute there should come a better acquaintance between city and country folks, more fellowship and closer sympathy. The Institute has been a thorough success. The "Chronicle" takes pleasure in devoting so much space to its proceedings and in thus bringing the Institute home to so many who were unable to attend the meetings.—Muskegon Chronicle, Jan. 15, 1896.

The Farmers' Institute held at the court house last Wednesday and Thursday may be put down as a grand success. The attendance was large and the consensus of opinion among the farmers is that it was a most profitable farmers' gathering. Deputy E. B. Ward, of the State Grange, and the gentlemen representing the State Board of Agriculture, vote it the most successful Institute yet held in northern Michigan.—Charlevoix Sentinel, Jan. 22, 1896.

The crowds that have packed the hall at every session since the first forenoon, show very conclusively that the farmers are waking up and taking an interest in better and more scientific methods of carrying on their business. Let the good work go on.—Harbor Springs Republican, Jan. 15, 1896.

The Institute may justly be pronounced a decided success in every respect, and we believe it will result in great good by its instruction and by awakening new interest and new thought along these lines. The Institute was well attended, but we are sorry to say that many of our farmers did not avail themselves of these opportunities.—Luther Observer, Nov. 22, 1895.

The Farmers' Institue held here the 28th and 29th was a decided success from every point of view. The largest attendance, the most enthusiasm, the greatest interest and the best music is the unanimous verdict of all present. Altogether, the affair was all that could be desired, and its success was the admiration and wonder of all.—Wayne County Review, Jan. 31, 1896.

The two days' State Farmers' Institute was held Wednesday and Thursday of last week and was an unqualified success.—Charlotte Tribune, Feb. 26, 1896.

This closed the Institute, and it is entirely within bounds to say that it was the most profitable and instructive agricultural meeting ever held in this county. Prof. Gladden said that he had been out on Institute work for the past six weeks, conducting Institutes in various counties, and that nowhere did he find better attendance. And it may be said that he found here a remarkably well posted lot of farmers, fully alive to their interests. The Institute was worth hundreds of dollars to the agricultural interests of this county, and the farmer who was short-sighted enough not to attend, is simply "not onto his job."—Tuscola County Advertiser, Jan. 24, 1896.

"Nothing succeeds like success," is a saying that was aptly illustrated by the recent sessions of the Farmers' Institute held in this village last week. "The Herald" has from the first maintained that the Institute would be a success, and no one who attended will dispute the accuracy of the prediction. The attendance throughout was good, while the interest taken could not well have been deeper or more genuine. In fact, it was so pronounced that with a great many it amounted to little less than enthusiasm. The instructors sent out by the State Agricultural College were not theorists, but were thoroughly practical men, whose knowledge had been gained only by long continued study, research and practical experience. Thus, it is not strange that so deep an interest should have been manifested, or that at the close of the Institute, a feeling that the same had been a genuine success, and that each one in attendance had gleaned a great deal of practical information should have been so plainly apparent.—Mancelona Herald, Jan. 23, 1896.

The first annual Institute of the Iosco county Farmers' Institute society was held at the court house, in this city, Thursday and Friday, January 9 and 10. The Institute was conducted by Prof. H. P. Gladden, of the State Agricultural College, and was beyond doubt a huge success in every way. Below we give a brief outline of the meeting, which, we feel, has been of vast benefit to the farmers of this community. It appears to us that this meeting and interchanging of ideas must prove of infinite value to those interested.—Tawas Herald, Jan. 17, 1896.

The Farmers' Institute held in this city last week, a full report of which appears elsewhere in this paper, was an exceedingly interesting and important event. It marked a new epoch in the agricultural development of the county and presages more heart and courage on the part of the farmer in his work. The attendance throughout was good, nearly every part of the county was represented. It is needless to say that the representatives of the Agricultural College did their part in a way to gain friends for that institution as well as for themselves. Nearly every person down on the program came forward and performed his or her part creditably, showing that there is ability among the farmers of Montcalm county—much of it was shown that was not down on the program. The next meeting, at Carson City, will bring out a larger attendance, as, having a taste of it, the people really like and want more of it.—Stanton Clipper, Jan. 31, 1896.

Institutes are good things.

Push them along.

The audience take a lively interest and are not a bit backward about quizzing the speakers.

The College lecturers are mostly young men, but they are bright and practical, and most of them are farmers by birth, training and experience.

The lecture by Lieut. Lewis, of the U. S. Army, last evening, on the importance of military training and the strengthening of the national guard, was a splendid appeal to the patriotic instinct. More should have heard it.

The practical butter making test yesterday afternoon, by H. E. Van Norman, was a feature of special interest to the ladies and many were out. The lecture accompanying the test illustrated modern dairy methods in use at the College, and was graphic and instructive.

—Alcona County Review, Jan. 9, 1896.

The six sessions of the Chippewa county Farmers' Institute as advertised for some time past in the program published, were held in the council chamber of the city hall on Friday and Saturday of last week, and were an unqualified success.—Soo Democrat, Jan 16, 1896.

The Farmers' Institute held in Centreville last Monday and Tuesday, like that of one year ago, was a pronounced success. The attendance at every session was most gratifying. The day sessions were well attended and those of the evening were crowded, and the interest manifested at all of them was marked. This year's Institute occupied but two days, only one-half of the time consumed by the one of a year ago, and the time was not adequate to the amount of labor undertaken. But much good was accomplished, all that anybody could reasonably expect in the time allotted, and if any particular interest has suffered through lack of as full a discussion as might seem desirable or necessary, it must be set down to the fact that more could not be done in so short a time. Mr. Sharp has been an excellent presiding officer, and it is quite possible that many will occupy the position before a better one is found. He has paid as strict attention as possible to the time set apart for the discussion of the subjects, and by urging the work of the Institute has accomplished much more than might have been done under the methods of a president with less "push." That these Institutes are doing much good nobody will deny. The intelligent farmer is now fully awake to his opportunity, has found that practical knowledge and not mere theory is being disseminated through them, and is striving to reach and apply the better methods taught in these gatherings. In these times of low prices and adverse seasons it behooves every agriculturist to be on the alert for any and all methods through the adoption of which he makes failure less and success a more certain factor of his calling. These Institutes cannot but be a great help to him in this direction. A membership costs twenty cents per year, and it seems to us that it is a dull mind which cannot pick up one hundred times their value during any complete session. And this also entitles the holder to various valuable reports which will be sent direct to him from the Agricultural College.—Centreville Observer, Feb. 1, 1896.

Thus closed, what is pronounced by all who attended, the best Institute ever held in Gratiot county, and by the State workers, the best they had attended this year.—Gratiot County Herald, Feb. 6, 1896.

The long Institute is a thing of the past. It has certainly been one of the best. if not the best, ever held in the State. The lessons have been good, and where notes were taken the various suggestions can be retained and carefully considered in the future. The peach received by far the greater attention, and by its prominence it is certainly entitled to this position. It is considered our mainstay, almost regardless of actual profit many times. However, the other fruits were given their proper attention, as well as fertilizers and cultivation, and no one with ordinary powers of observation could fail to receive lasting benefit. The Institute was more than a success. It has met the expectation of the State authorities as well as the home workers and listeners.—South Haven News, Feb. 12, 1896.

Grand Rapids, Mich., February 14.—(Special.)—The "Round-up" Institute came to a close tonight, and not a man has been connected with it but who feels like throwing up his hat and cheering in delight at the signal success achieved. The Institutes all over the State were a decided benefit to all who attended and the "Round-up" in this city capped the climax of success. There is no doubt that the whole farming fraternity of the State will heartily demand of the next legislature a continuance of the Institutes.—Detroit Free Press.

THE "ROUND-UP."

Three days of the program of the Farmers' "Round-up" Institute have passed, and the final exercises will take place today. The steady attendance and close attention manifested in the meetings are ample evidences of their success. With the close of the convention will end one of the most important, and, from an educational point of view, most successful meeting of agriculturists ever held in this State. Wednesday, the cultivation of fruit was discussed by professional and practical farmers. The principal part of this discussion was devoted to the peach and the strawberry—two of the most delicious fruits in the world. Yesterday, stock was the leading topic, especial attention being given to cattle and the making of butter. It is true that, among the farmers present—practical and successful farmers—there were wide differences of opinion as to which lines of stock and fruit can be raised at the least expense and greatest profit. But, it is also true that each expression of opinion has added something to the general stock of knowledge held by those who listened to the discussions.—Grand Rapids Democrat, Feb. 14, 1896.

THE WOMAN'S SECTION.

The woman's section of the composite meeting called the "Round-Up" was a notable if not a historic gathering of representative women. The women came from different parts of the State to give and receive inspiration on matters relating to the interests of their homes and firesides. In the interchange of ideas, there were brought forth sentiments worthy of statesmen and matters that pertained to the welfare of their daughters and sons. Most of the visitors were from country districts. But, in every utterance of the discussions was evinced an intelligent insight into the progress and demands of the day. If all mothers and home keepers should put into practical use the teachings of the womanly women of yesterday's meeting, the social problem would be solved most happily. We are glad they are with us and regret that their stay may not be longer.—Grand Rapids Democrat, Feb. 13, 1896.

THE FARMERS' GRAND "ROUND-UP."

In acknowledging the kindly recognition given "The Free Press" by the farmers of Michigan, we avail ourselves of the opportunity to again express approval of the work they are accomplishing through the Institutes which have been so fruitful of good results during the current winter. To perfect organization, to arouse interest, to enlist workers and to make operative the best system for conducting these Institutes has been a labor of time and patience. But that these efforts have been crowned with success requires no other evidence than is afforded by the sixty-eight Institutes held during the season, and the grand final announced in a four-days' session at Grand Rapids. The money thus invested by the State will be returned many fold through the increased production and permanent advancement in the value of farm property. It is an appropriation in the interests of education that cannot but net a handsome return.

Those who have read the reports of these gatherings throughout the State, as given through the columns of this paper, cannot but realize them worthy of the approval we have given. They are not devoted to academic discussions or the debate of questionable theories, but they deal with practical problems that bear directly upon the success of the farmer in all departments of his calling. There is an interchange not only of ideas but of actual experiences, and the man who learns something regarding one subject becomes the teacher in dealing with another. The most valuable knowledge thus elicited becomes the property of all and the inevitable result is the general improvement of farm methods throughout the State.

In dealing with economic questions that directly affect their bank accounts, members of these Institutes are acting entirely within their province. Organization for the purpose of becoming better farmers and making more money, carries with it the duty to provide against robbery of meagre profits by legislative extravagance. The demand for the more economical administration of our State affairs is one that must be enforced, and by no class can this just concession to the people be more surely or more effectually carried into effect than by our great agricultural population. They have taken the evil in hand and it is to be hoped that they will not stop or turn back until the matter which so materially affects them is disposed of in the interests of thorough reform. The scandalous action and financial excesses of the last legislature have aroused a public sentiment that should insure against any such future infliction. The farmers are engaged in a good work for themselves and for the entire people of the State.—Detroit Free Press, Feb. 11, 1896.

FARMERS' INSTITUTE.

The Farmers' Institute which was held in this city the past week was, without question, one of the largest, longest, and withal the most interesting gathering of its kind which Michigan has had in her history. There have been Institutes and Institutes, but scarcely one of them attained more than local interest. The "Round-up," as it was called here, after sixty-seven others had been given in as many counties in the State, was opened by Gov. Rich and closed with a "good-night" by ex-Governor Luce. It assumed a true State importance and had representatives from a very large number of farmers' clubs and organizations all the way from the far upper peninsula to Detroit. Leading parts in the four days' program were taken not only by teachers from the Agricultural College, who have made their subjects a life study and observation in this and other states, but also by representative farmers who till their own fields and have wrung success from the soil by their own efforts. The city people who were not interested in the proceedings could hardly have failed to catch some of the spirit and enthusiasm for the farm had they been a spectator of the eager cross questioning which followed each address made. There was something so practical about it, and whether it was horticulture, stock raising, or farm grains, there was something in it all which as vitally concerned them as a banker his securities or a clothier his number of sales. One significant fact developed which is full of suggestiveness for the near future. It was clearly and strongly manifest in the address of Governor Rich on the opening evening, when he felt called upon to reply to the question, "Is the State government worth what it costs?" and was still further emphasized on the closing evening by Prof. Hedrick outlining an entire new tax system. It is not impossible that Prof. Hedrick's plan is a good one. At the recent large tax convention which was held in Chicago, the Pennsylvania plan of taxation was eulogized without stint, and this was the plan Prof. Hedrick proposed. He would support the State government by specific taxes on corporations, inheritance taxes and taxes on natural monopolies. He would support county and township organizations by taxes assessed on real and personal property, either by appointed officers or at least by those elected to spread the taxes on an entire county, doing away entirely with township assessors. Such a system would vastly simplify tax gathering, and, as he urged, avoid the present temptation to undervalue some townships and overvalue others. The residents of one county could then say what they were willing to pay for local government without consulting the State or aiding it directly. They would be to blame for their own high or low taxes. The Institute was an unqualified success, and the local managers, as well as Mr. Butterfield of the College, deserve great credit. The $5,000 contributed towards these sixty-eight Institutes by the legislature was wisely spent.—Grand Rapids Herald, Feb. 16, 1896.

END OF THE "ROUND-UP."

With the felicitous speech of ex-Governor Luce last evening, the proceedings of the "Round-up" Institute of the farmers ended. The record of the meeting will go down in the farmers' history of Michigan as the most successful affair of the kind ever known. The subjects discussed embraced a large share of all that directly or indirectly interests a farmer, while the method of conducting the program can be defined in the single word "successful." The proceedings were opened by Gov. Rich and closed by ex-Governor Luce, while the other gentlemen on the program are men, who, in their respective lines, have attained the highest degree of success. They were selected for the purpose of telling their coworkers the secrets of their own success; and the clear, concise, and able manner in which they did this speaks well for the farmers of Michigan from an intellectual and educational point of view. During the convention experienced men discussed the proper soils for different crops, the rotation of crops, the preparation of the soil to receive the seed and its cultivation in time of growth. Successful cattlemen were there to explain the specific qualities of the different breeds of animals and tell from experience how to procure the best beef and butter at the least expense. Dairymen were there to instruct in the process of butter making. Fruit growers were present whose success in their line has reached the boundaries of many states. They told, in their own plain way, how to trim a tree, how to cultivate it, how to pick the fruit, how to pack it, and how to ship it. Then, as each fruit and vegetable and tree and grain is subject to attack and destruction by germs, worms, flies and other agencies and diseases, the best means for detecting the presence of danger and of destroying its elements were discussed—so that for the destruction of some pests, more than half a dozen good remedies were suggested. Altogether nobody, however efficient and successful he might be in farming, could attend such an Institute as the one just closed without gleaning at least a little information on some points.—Grand Rapids Democrat, February 15, 1896.

EXTRACTS FROM LOCAL PAPERS.

At almost every Institute there were articles read by local speakers that are as worthy of publication as anything which has already been printed in this bulletin, but we have already exceeded the limit set for our bulletin, and it will be impossible to publish any of these valuable articles at length. We have decided, therefore, to take extracts from as many of these articles as we have received. Although, in many cases, this is hardly justice to the excellent articles, yet it is the best we can do this year. We believe that readers of the bulletin will find here some most valuable suggestions. We wish sincerely that we had more space to give to these local papers.

THE MOST PROFITABLE STOCK FOR THE FARMER.

D. D. BUELL, UNION CITY, AT BRANCH COUNTY INSTITUTE.

I have raised the fast horse and the slow one, but have never found anything that brought in more net gain than the grade Percheron and Clyde. They have the size, and if crossed right, the durability. I have had the fortune to live between neighbors that had high bred trotters. I have seen them develop their speed, and sometimes they get a horse with splendid action. But I have noticed that every corn field adjacent to those tracks where they train gets so interested in the races that the corn almost forgets to tassel out and the ears never get larger than nubbins; that the wheat is half chess, and the oats light weight; all of which proves to my mind that farming and the fast horse business were never intended to go hand in hand. Do not understand me to say that the trotter should not be raised. Branch county is proud of her fast horse record, but I earnestly believe that the fast horse business should be a specialty where men have time and money to develop speed, and not mix it up with general farming.

JERSEY CATTLE AND DAIRYING.

MR. J. N. BAUER, HASTINGS, AT BARRY COUNTY INSTITUTE.

The Jersey, then, having the qualifications for economical butter producing, and having them fixed by higher, long continued, pure breeding, challenges competition in this her special field. No intelligent farmer seeking for a butter cow that will help him pay his debts, will be disappointed if he buys a good Jersey. Nor will he ever exchange her for a cow of another breed. Many think and say, "a grade will answer my purpose." Well, indeed, a grade will be an improvement on a scrub, but if a half-breed is good, a full-blood will be better. You will then start right.

I have known many who commenced with grades but were not satisfied. A thoroughbred was soon purchased and the grades were sold to some one else to begin with, and they in turn wanted thoroughbreds. Many farmers have reached a point where general farming is no longer profitable under existing conditions, and they are looking for some branch of agriculture that will pay. In any location, what would be more profitable than keeping a few good Jersey cows and building up a trade in butter? Get a small separator and a Babcock test and begin. Make nothing but good butter, keep nothing but good cows, strive to please your customers, and I assure you the venture will pay. This is especially true near small towns outside the strictly dairy districts, for there competition is not so great, and good butter is more thoroughly appreciated. If you start first, you will get the best trade, for these small home markets often pay better than in the cities. It is scarcely two months since there was a butter famine in this town, and for several days no butter could be had; and this occurs often. Good butter will always sell, and more dairy farmers are wanted in our own community.

COMMERCIAL FERTILIZERS.

W. H. WOODHAMS, KALAMAZOO, AT KALAMAZOO COUNTY INSTITUTE.

On what crops should farmers use fertilizers? From my standpoint I should say on clover, roots, and soiling crops, and fruits of the best kinds. To the unthinking, careless farmer the fertilizer is a damage, but to the thinking farmer the development of the fertilizer offers the richest promise of any of the aids given us by any of the agricultural scientists of this wonderfully progressive age. Of its use on clover it will oftentimes pay for itself in the crop with which the clover is sown, making the even catch of clover the profit. Of the value of profitable clover catches this audience does not need to be told. On roots for sale or feed it is certain to be profitable because they require a large amount of labor whether the crop be large or small, and while one is at expense, the expense better be made great enough to make a reasonably sure thing of the result. Besides which, roots of all kinds, including potatoes, are much handsomer, freer from worms, rot, and scab with fertilizer than with manure. That commercial fertilizers should be used on fruit should go without saying.

MARKET GARDENING.

JOHN FISCHER, AT SAGINAW COUNTY INSTITUTE.

Every market gardener knows that in order to grow the most perfect vegetables he can not make his land too rich, but a great many of them do not seem to know that the liquid manure which they allow to go to waste would be worth more to them if properly saved and made use of than all the solid straw, called manure, would be to them. I have always depended more on liquid manure to raise good vegetables than on anything else, except perhaps the quality of the seeds to be sown. When I speak here of the quality of the seeds, I want to include their purity also as to variety. Owing to mistakes made by seedsmen, I received several times varieties which I did not order. To avoid further annoyance, I determined to grow the seeds of those varieties which I desired to raise in large quantities upon my own premises, and I have found so far that they are invariably plumper, and were the same kinds I bought of dealers. As most seeds retain their power of vegetating for several years, we can, by making a careful selection each year, grow our own seeds, selecting such varieties as will not hybridize if planted closely together.

HOW TO RAISE 60c. WHEAT.

FRANK R. SMITH, SOMERSET, AT HILLSDALE COUNTY INSTITUTE.

To raise 60c. wheat at a profit, you must cheapen the cost of production. To do this we must arrange the rotation of our crops in such a way as to have our wheat preceded by some crop that will leave the ground in shape for it without plowing. Corn has been the leading crop for this purpose, and it is yet a good crop to follow with wheat provided the ground is cleaned from weeds and in good condition for the wheat crop. A great many object to raising wheat after corn because they say they cannot get a crop. Now, the difficulty in such cases is that the land is not in condition. Land that is rich enough for a good corn crop will give a good wheat crop, unless perhaps it be low land or heavy soil. You can not expect a good crop of wheat on land too poor to grow good corn. A great drawback in growing wheat after corn, is we usually get it too late to give it sufficient start in the fall. However, if it be put in early with ground well fitted, we usually get a good crop. In the same field last year we could see no difference between the corn stubble wheat and the oat stubble wheat. In our locality beans are being used quite extensively, and we find it a good crop to follow with wheat.

LITTLE THINGS.

JAY SESSIONS, MAPLE RAPIDS, AT CLINTON COUNTY INSTITUTE.

A person going to build a house or barn or lay out his farm into fields must arrange with reference to a plan that will have everything in its most convenient place. In short, have a system and not the tumble together style that is so often practiced. Of course all these little details apply with equal force in the proper arrangement of stock. Many a poor farmer will turn his poor sheep into a field during the hottest and dryest time in summer where no water is to be found, and in the fall, to save a little feed, compel them to shiver in fence corners, and then by spring have a few living skeletons and plenty of pelts. Such a one generally thinks sheep don't pay, especially without a high tariff on wool.

Not to dwell with details we will, for a minute, look at "little things" from a hygienic standpoint. At first the wonderful power of heredity, over which we have no control so far as ourselves are concerned, has a great influence on health, but it is a problem that ought to be handled in some way for the good future generations. Every intelligent breeder of domestic animals obeys this law, and without properly considering it our fine breeds of live stock could never have been produced. Is a perfect animal of the genus *homo* any the less to be desired?

Many things contribute to the general health. Cleanliness of the body is one of the most essential, but possibly one of the most neglected with a large class of people. To many, the statement will seem incredible that a large number of so called civilized people go from year to year without a good bath, but there is no doubt but that such is a fact. Proper clothing in reference to comfort is an essential, and with children is often sadly neglected. Pure water for family use is much to be desired, but by no means always obtained. Barn-yard and out-house drainage into the well is not calculated to save doctor bills. A good tubular well is perhaps the only safe one from which to draw the family supply of water. I will not stop to mention the influence proper arrangement of all surroundings so as to be convenient and pleasant has over health.

ADDRESS OF WELCOME.

ED. E. EDWARDS, FREMONT, AT NEWAYGO COUNTY INSTITUTE.

The urban populations are plainly being revived and augmented by accessions and accretions from the farms. The life of the farm, the character building done on the farm, is steadily being filtered into our national life at almost every turn, and it speaks volumes in praise of the work in this line done on the farm that the effect upon the people of the country at large is so good. Where a large river pours its flood into the ocean and far out to sea the waters of the river are plainly distinguishable by reason of their purity, I may safely say that the sources of the river are also pure.

THE FUTURE OF FARMING.

J. W. MORLEY, MOSSBACK, AT KALKASKA COUNTY INSTITUTE.

Men prefer to live in cities. That is the way they are built. But, as some are not as fortunately situated as others, some have to be denied the pleasure of living in cities, just as some have to be denied the pleasure of owning French music boxes. Not all men have a right to live in cities. Only those who have the means to maintain themselves without the aid of public charity, have a right to dwell there. Many times public alms is far more of a curse than a blessing. It takes away that sturdy independence and that solid satisfaction that come from good, hard battling with the problems that confront us in life's pathway.

But let us take courage from the fact that farm life is irresistible in its attractions to hundreds of thousands of men; and it is to that attractiveness and to their enjoyment of farming that we must look to the maintenance of the necessary balance between the city and the country. The delight in seeing things grow and in feeling that we have a hand in their growth is an unselfish and pure enjoyment known to few occupations in city life. The farmer, too, is always buoyed up by hope of better times—even though it is necessary to do some voting to bring them about. He has an abiding faith in the necessity of his business to the world. To many men of the finest mould, farm life has an irresistible charm.

GRAINS AND GRASSES.

D. D. MILLS, SHERMAN, AT MASON COUNTY INSTITUTE.

But we would have you take a still broader view of the dominion of these products. They are not only the chief factors in sustaining animal life, but in sustaining the fertility of the soil. If we feed upon them, so does our Mother Earth, from which she receives strength to support her vegetable offspring. The field of well grown tubers makes its profit from the overturned sod beneath; after first serving as food for our stock these go out to fertilize the orchard and create the savory apple and delicious peach. Without these our land would soon become lean and denuded, and its products dwindle away. Our fruit kings and potato lords only hold their dominion in fief from the grasses and grains. They should hasten to bow to the waving clover and doff their hats to the nodding wheat stalks, and together acknowledge with us all, "We are thy grateful subjects."

KEEPING BOYS ON THE FARM.

HIRAM RIX, JR., WILLIAMSTON, AT INGHAM COUNTY INSTITUTE.

1. Study your boys' natures and do not insist on any of them staying on the farm when they seem to be better adapted to something else.
2. Those who belong on the farm should be taught that to be a true farmer, successful and progressive, requires as much or more common sense, energy and brain work as does any other vocation, and that the opportunities for breadth of culture and the development of true manhood are fully equal to those in any other profession.
3. That it is easier for a farmer to be honest and upright in his dealings if he wishes to be, than for those in some other professions, notably doctors, lawyers, and merchants, as he is not subject to so many temptations to sharp practice and crooked work.
4. That a farmer's life is most independent in its nature and in respect to his relations with his fellowmen, from the fact that his business and financial prosperity does not depend upon his popularity in society nor his currying favor with any one. Consequently he can accept or reject dogmas in religion and politics in accordance with his best judgment and the dictates of his own conscience, reaching out into any line of investigation and progressive thought, without reference to its effect upon his popularity or business.
5. It is our duty to so arrange the financial system of this nation that it will not take so much of the products of the farm to buy a dollar as it does now.
6. That a proper limit to the ownership of land is a prime necessity of the times; thus abolishing the monopoly of land, and making it possible for our boys to procure farms.
7. That we must rouse from our apathy, throw off our partisan chains, learn that we the people are the government, cease to be led like lambs to the slaughter, and go to work in earnest for justice and human rights.

THE UNAPPRECIATED SIDE OF FARM LIFE.

FLORA C. BUELL, ANN ARBOR, AT WASHTENAW COUNTY INSTITUTE.

How are you preparing your girls and boys for the fullest and noblest life? Are you instilling into them the purity and holiness which is so abounding? A mind filled with pure and lovely images does not crave the impure, coarse, and vulgar. Are you living with them in their discoveries and leading them to see that nature possesses nothing that is not of interest? Do they know that the dirt colored skin of the earthworm itself bears the hues of the rainbow? Do they know which way its bristles point and why? How many rings he has, does he always crawl with the same end forward? Did they ever hold the small pale worm in the light to see the circulation? It is said "To learn all the interesting things about an angleworm is to receive a liberal education."

Supply the home with books and papers which will be suggestive. Let the children have botany, geology, ornithology, clubs; encourage the teaching of these subjects in your schools. Take them with you for walks and drives. A visit to an art gallery can not surpass a ride on a joyous spring morning, or on one of the year's delightful holidays—a rich, tranquil day in October, when the "air is potable with gold," the atmosphere is visible sunshine, the woods rich and splendrous in their "robes of praise" and when the

> "Scarlet oak and goldenrod
> With blushes and with smiles
> Lit up the forest aisles."

Nature appeals to the best in man. When communing with her in form of the rolling ocean, gigantic trees or tiny flowerets, she ever speaks the same of the littleness of man, and grandeur of his Creator. She is of use to man only as he sees through and beyond her—to symbolize a deeper truth than appears on the surface, for "Every natural flower which grows on earth implies a flower upon the spiritual side." She is new and fresh every morning because she is unconscious of herself, whispering of her Maker.

FUEL SUPPLY OF SAGINAW COUNTY.

S. G. HIGGINS, SAGINAW, AT SAGINAW COUNTY INSTITUTE.

This subject may, at first glance, seem a peculiar one for a Farmers' Institute. Directly the farmer has little to do with the question of fuel supply, but indirectly it is a matter of most vital interest to him. What is it that gives a farmer a market for his crops? It is the employment of large bodies of men in manufacturing, and we all know that fuel is the great foundation of all manufacturing; it is the energy which turns the wheels. The more the manfacturing interests of Saginaw are developed, the more farm products will be required to feed the men who work in the factories. If all our people were engaged in agriculture each one would raise simply sufficient for his own use, and there would be no market for surplus products. When the factories are idle the employes must turn to the cultivation of the soil for their support, which not only cuts off the market of the farmer, but creates a still greater supply of his own products. Agriculture, mining and manufacturing must go hand in hand, and each is dependent upon the others. What we need .in this country today is more factories. We produce more than enough from the soil to supply our needs, but foreign manufactured goods still continue to flow in and find sale among our people. The sooner we reach the point where we manufacture practically everything our own people need the better off we shall be as a nation. The increasing number of workmen in the factories will consume larger and larger quantities of farm products here at home, and save the necessity of selling abroad at low prices.

ECCENTRICS.

MRS. DR. KIRBY, PETERSBURGH, AT MONROE COUNTY INSTITUTE.

Noah Webster defines an eccentric to be an irregular person or thing. Shakespeare, who knew a great deal about almost everything, decreed that eccentricity is akin to madness. Another of equal authority tells us it is originality; another that it is inspiration, and lastly an eccentric man is defined as being a true man in a false world. In mechanics there is a little wheel called an eccentric that can start all the machinery with a jerk and keep it going. It is the eccentric in human life that can start the machinery and play upon other minds as a master would play upon a harp, or as the biographer of Rufus Choate said, "he can make his own kindling wood and start his own fire." If a man or a woman has an original idea and attempts to put it in execution, straightway public opinion counts that eccentric, if not positively insane. So it is not a bad idea to study eccentric characters, especially if they are strangely good or useful.

IRRIGATION FOR FRUIT IN OCEANA COUNTY.

BENTON GEBHART, HART, AT OCEANA COUNTY INSTITUTE.

Some nine years ago, or the first dry season which the fruit growers of Oceana county experienced, I had a good opportunity to test the applying of water to some plum trees which were loaded with fruit, the soil being so very dry that the fruit was fairly shriveled on the trees. My first plan was to apply water by the use of pails, putting on from a barrel to a barrel and a half to each tree on the surface of the ground every other day. This proved to be of little benefit as the water would dry up before it reached the roots of the tree, and would only revive the tree and fruit during the night. In the day time the trees would again look withered.

My second plan was to dig three or four large holes down to the roots, say from three to five feet from the tree, according to its size, and then apply the same amount of water as before in these holes, and when soaked away, covered the surface a little with dry dirt and stop evaporation of the moisture. This latter mode with the same amount of water, or even less, proved to give good results, and was a paying business, so much so that the trees and fruit would revive, commence to grow, and mature the fruit for one week without applying water after giving them several good applications. In irrigating and applying water to small fruit I would prefer and have practiced mulching, either along the rows and hills with some close material which will pack close to the ground in order to retain the moisture on the surface of the soil. In raspberries I have done this, applying through the mulch and cultivating between the rows. If no mulch is used I would draw a small furrow near the roots of strawberries and raspberries and apply the water in a continuous stream along the plants, and if water is not used daily, it would be best to dust a little dry earth on top of the soil in order to stop too much evaporation before applying again. With me there is not a particle of question but what irrigation will pay in certain locations and on small fruits, provided water can be obtained at a small cost. The principal point in irrigation is to have a good supply of water in the first place, and not at great cost, and to so place the water near the roots of the plants and trees that they may receive the full benefit before it evaporates.

FARMING IN SCOTLAND.

ALFRED R. LOCKE, BELDING, AT IONIA COUNTY INSTITUTE.

Their methods of agriculture are rude in many instances as compared with ours. They depend greatly upon hand labor. Instead of wagons for the handling of produce, they use carts drawn by one horse, and while in many instances they are convenient, yet when one sees both cart and horse nearly concealed by a load of hay or grain, the advantages of our wagons are conspicuous. Their field plows are small, turning a narrow furrow, and the soil is turned only to the depth of four or five inches. This on many farms is necessary as the rock comes within a few inches of the surface. Very few use improved harrows and cultivators, and fewer still harvesters and binders. Field work is done by both women and men, and it is a very common sight to see women taking up their beat after the sickle or the reaper, or using the hoe and the harrow tilling the soil. It is also the duty of the housewife and the girls of the family to look after the cows and attend to the milking. In all the departments of farm work we find neatness and dispatch. The housewife is neat, and although her duties are divided between the farm stables and the house, there is no negligence in her work. Her butter is the finest, her cheese is the best of any produced. Scotland butter sells in the market at from four to six cents per pound more than any other make. The pains that are taken in the manufacture of cheeses always brings for them an extra price over those foreign made.

THE COMING WOMAN.

MRS. WM. MASON, KENOCKEE, AT ST. CLAIR COUNTY INSTITUTE.

I believe husbands will rebel against the following suggestions which I make to you: Whenever you spend in a foolish or unwise manner ten cents or more just drop into a purse for your wife the same amount. The aggregate in one year would give her a nice sum that would bring forth its fruit in her purchasing something with which to embellish the home, besides saving her the great annoyance of being obliged to ask for every penny she needs, and perhaps listening to the reply: "What did you do with the 50 cents I gave you last week?"

Happy is the man who takes his wife into his confidence. In prosperity or adversity it always pays to make her your confidante. Morally, socially, and intellectually woman is man's equal, and if she desires to extend a helping hand toward the attainment of our ideal civilization, she is prompted in her efforts, in that she believes that the human race is as a whole destined to attain to a status hitherto undreamed of. In that ideal civilization woman shall walk hand in hand with man, and as Paul Jean has said: "No man can live piously or die righteously without a good wife." The wife shall be the man's helpmeet in this ideal civilization. The selfish element in man shall have disappeared and the nobler elements of his nature shall be developed under the benign influence of woman, and much that is coarse and unwholesome shall have been rooted out of his nature, and in time Shakespeare's eulogy may apply: "What a creature is man, how noble in reason, how infinite in faculty, in form and moving how express and admirable, in action how like an angel, in apprehension how like a god!"

GROWING AND STORING ONIONS.

OSCAR INMAN, AT MIDLAND COUNTY INSTITUTE.

I formerly grew the Yellow Danvers or Globe Danvers; but I found out that if the season was backward, a good many of them had green tops and large necks at the time of the year when I ought to be pulling them, so I began to look around for something earlier and surer of getting ripe. I found just what I was looking for in a variety called the Early Yellow Cracker. It is a good yielder, a good keeper, and at least two weeks earlier than the Yellow Danver and with no tendency to grow scallions. Before closing this talk I want to give you a little advice about buying seed. Don't buy seed that you know nothing about, because it is cheap. Buy of no one but perfectly honest and responsible growers. Onion seed will all grow until it is two years old. The third year about two-thirds will grow, and after that it is no good. I would not sow seed that I know nothing about if it was given to me, as there is too much at stake in growing onions, and it costs just as much to grow one-half a crop as it does a large one. I have grown 750 bushels on one acre, and have measured small pieces in my field that yielded at the rate of 900 bushels. But of late years I have not done so well on account of the ravages of the onion maggot, which I can find no way of exterminating, but I think I can check them somewhat by changing the ground on which I grow them from one part of the farm to another. If not troubled with the maggot they can be grown any number of years on the same ground if kept supplied artificially with fertility.

MIXED FARMING.

BYRON BRAY, UNION CITY, AT BRANCH COUNTY INSTITUTE.

The most important thing is the different varieties of soil. The next is the fertility of the soil. With this we have a basis to commence the practical work of mixed farming. The farmer should study the nature of soil of each and every field on his farm until he finds what crop will turn a good yield, and that is the crop to be sown or planted on that field. If the farmer wishes to sow oats, he should select out the fields that are adapted for oats, and then sow good seed, and there will be no mistake in the crop of oats. The same may be said of corn, and there is no crop that is raised in southern Michigan that is of more value to the farmer than a good crop of corn, and it should be one of the leading crops on the farm. There is no crop from which we can receive as much benefit, there is no grain that will return as many dollars to the farmers' pocket, it will produce more pounds of mutton to the sheep breeders, than any other variety of grain, and it will produce more beef and solid pork than any grain we can raise. Now, this crop should have special care and attention. I would advise early plowing, as soon as the ground is fitted in the spring. Then do not get in a hurry to plant; let the warm sun fall upon the soil, and while this is being done, keep the team fitting the ground. I would roll well, until all of the seeds are well pressed down so they will hold the moisture in case of a drouth, and then harrow the ground well until the surface is well fitted and you have a good seed bed for the corn. I believe it is essential that the ground should be thoroughly worked before the corn is planted.

FLORICULTURE.

MRS. IDA DE VOIST, AT OCEANA COUNTY INSTITUTE.

Flowers are the true friends of all, and we look with amazement at the person who cannot find some pleasure in their cultivation. The vocation of a florist is one that gives constant employment to the intellect in planting, transplanting, cultivating, and protecting from summer drouths and heats and winter's frosts. The florist becomes intimately acquainted with a great number of species and varieties of plants and flowers, which educates and unfolds the intellect. Many plants have been so far changed by culture that the wild stocks from which they have sprung are scarcely discernible, although they still exist. The highest taste and best culture are formed from the study of nature, and there are no better standards than those which nature has furnished. They are better helps in the formation of character than all the architecture of the world, or the most beautiful creations of artists. Rose culture may claim to be quite the oldest, the most highly developed of man's struggles with nature.

SPRAYING FRUIT TREES.

J. F. TAYLOR, DOUGLAS, AT ALLEGAN COUNTY INSTITUTE.

It is often that the spraying part of a fruit grower's work, which has attracted attention only during the last decade and even now is neglected or indifferently performed, must come to the front and take the first place. We may trim our trees after the most approved model; we may cultivate our ground with the latest inventions in machinery, and fertilize it with the most scientific combinations of potash, nitrogen, and phosphorus, and yet utterly fail to get desirable results in quantity and quality of fruit unless we can protect it against these multiform enemies. The work to be done is expensive in machinery and in time to use it, but good fruit without spraying in the most thorough manner seems to be about as impossible as to grow it without trees.

HOW CAN WE AID IN IMPROVING OUR DISTRICT SCHOOLS.

D. C. WARNER, DOWLING, AT BARRY COUNTY INSTITUTE.

Of all things connected with our lives or with the welfare of our families, there is nothing in which we are so inconsistent as in the supervision of our schools. I wonder how long the farmer could run the farm, the manufacturer his factory, or the tradesman his shop if he delegated to paid overseers the full management and control of his business. And yet that is precisely what we do in respect to our schools. We build and furnish schoolhouses, pay our taxes, authorize the school board to hire the teacher, and then trust to the entire supervision of the commissioner of schools, who will visit the school during two half days' sessions once or twice at most during the whole year.

WINTERING STOCK ON THE FARM.

J. W. SPRINGSTEEN, DOWAGIAC, AT CASS COUNTY INSTITUTE.

We next come to considering the pig, an animal that needs no introduction here as he generally makes himself known wherever he is. He has a few wants, however, which his owner will find it to his own profit, as well as the pig's comfort, to supply. First of all, from infancy he wants a dry bed, just warm enough to be comfortable. More pigs die of disease contracted by lying in a damp nest than from any other cause. His food may consist of almost anything that is edible, but as long as the farmer raises corn, it will continue to be the pig's principal diet, and so long as he continues to be a pig he won't object to it. It should be fed, however, in moderate quantities, and everything from the house for which no other use can be found may be profitably fed to him in the form of swill, even including the soapsuds. The pig is also the scavenger of the farm and the means by which the 10 per cent of the corn fed to the cows must be used. Therefore he should have free access to the feeding yard except at feeding time, and to all other places where there is likely to be anything in the shape of food going to waste.

WELCOME ADDRESS.

N. E. BACHMAN, STANTON, AT MONTCALM COUNTY INSTITUTE.

The man who owns and successfully operates a good farm is, or can be, one of the most independent men living. It matters not how hard times are, or how many thousands upon thousands in the commercial centers are suffering for the bare necessities of life, he is always assured of a good wholesome living for himself and family. It is true that he cannot accumulate wealth as rapidly as many other men, but it is also true that he cannot be a wealthy man today and a pauper tomorrow, with all his friends and associates condemning him for his dishonesty.

SHEEP AND HOW TO MAKE THEM PAY.

L. W. OVIATT, NORTH WILLIAMS, AT BAY COUNTY INSTITUTE.

For those who have plenty of winter feed and a good place, we would say, get a Christmas contract and feed for Christmas. Or, if you have many lambs, and buy a few more, feed for the Buffalo market. But in this case do not sell until from February to April. If you have a warm place to shear, you can sell in February. With me clover and corn have proved to be the most satisfactory feeds. We have used a self-feed for several years, but after much experience, we prefer feeding in the folding rack. In buying and feeding for the eastern markets I have a few rules, given me by a prominent sheep man a number of years ago, which my own experience has proved to be correct:

1. Never feed rams.
2. Never buy old ewes to feed.
3. Never let your ewes get with lamb.

As to sheep paying in Bay county, I have only to say that our sheep have paid us well, lambs of our own raising bringing us from four to six dollars per head.

HOW TO PLANT AND GROW STRAWBERRIES.

D. E. HOUK, AT MASON COUNTY INSTITUTE.

A good crop of strawberries can be grown on almost any kind of good soil from sand to muck, if there is good underground and air drainage. Preparation of the soil should commence the summer before setting. You can get strawberries after almost any farm crop, potatoes being preferred as they leave no stubble. Plow the ground as soon as the crop is harvested. Harrow a few times before winter, then plow again in the spring and plow deep. Harrow until all is pulverized, make smooth with a float, mark both ways as far apart as you wish to set the plants. We set three feet each way as it gives room to cultivate both ways for the first season. In setting the plants we use a common short-handled spade for making the holes, then place the plants in the holes, step firmly on one side and the plant is set.

POTATO CULTURE.

T. A. DIKEMAN, HART, AT OCEANA COUNTY INSTITUTE.

Fall plowing I think is preferable, but if not practicable, plow as early in the spring as possible unless you have rye to turn under. Then I would leave it until about ready to head, when I would plow deep and follow with the harrow strip by strip until the field is finished. Harrow until the soil is fine and all grass and weeds are well subdued. I still prefer planting in wide rows, about three feet nine inches north and south, and two feet six inches east and west. It saves time in cultivating, and I am satisfied that the potatoes will stand the hot winds and dry weather better. It admits of later cultivation without disturbing the heavy vines, a thing which is very important. I cultivate deep and close to the young plants, and very shallow late in the season. This cultivation should be done about once a week for eight or ten weeks, weeds or no weeds.

WOMAN'S INFLUENCE.

MRS. MARY ROBERTSON, HESPERIA, AT NEWAYGO COUNTY INSTITUTE.

But the sweetest name in all the earth is mother, and the dearest spot is home; and may God help the man, woman or child who has neither. The mother is the presiding genius, the queen of love and beauty; and home is what she makes it; and the spell she casts around her, whether it be for good or evil, is lasting for all time. Napoleon says the future destiny of a child is always with the mother; that is probably what sent him to St. Helena. The overthrow of nations has been traced back to the evil influence of mothers. Catherine De Medici was the instigator of one of the direst deeds ever known in history, the massacre of St. Bartholomew. Benjamin West said that his mother's kiss made him a painter. The gentle mother of Robert Burns imbued her spirit into her young son by telling him the traditions of her country while seated at her wheel. That spirit bursts forth in the beautiful songs that have made so much music for the world. It has been said that home is where the heart is. The sailor as he paces the deck at midnight, listening to the ceaseless splash of the waters, and the creaking cordage, in fancy sees the image of loved ones, and the little cot by the shore passes through his vision. And many a silent prayer has gone up to the throne of Grace, as the tears coursed down the bronzed cheek, that the bark would anchor safely in the harbor of home. Children, prize your home. Mothers, live such lives that your influence will shed a lustre that time will never dim, so that when your tired hands are folded peacefully on your breast, and the toil in your home is over, your children may say of you: "This was our queen, this the shrine we worshiped; so long as we live never shall we forget your teachings; they will follow wherever we lead and save us from the evils that threaten. To us you have been queen on earth, bright be your crown in heaven." May God prosper the woman of every clime whose sweet and holy influence has circled the world like a halo of glory, and may He hasten the day when she shall stand where she rightly belongs.

THE HOME DAIRY.

H. J. FLYNN, MARSHALL, AT CALHOUN COUNTY INSTITUTE.

Our dairy is a room partitioned off from one corner of the cellar. It is lathed and plastered, has a cement floor, and is well lighted by two windows on opposite sides, which can be opened to allow a current of air to pass through. On one side stands a tank about ten feet long, fourteen inches wide, and twelve inches deep. From the windmill a pipe leads to the tank, and another waste pipe leads out again to the big stock tank in the yard, so all the water raised by the windmill passes through the tank in which the cans that hold the milk are set. This gives the most uniform temperature possible to be obtained, that of the water at the bottom of the well, and is a very important essential. There is a table to work the butter on, and the churn stands close at hand. The skim milk is carried by a waste pipe to a tub outside, where it can be easily fed to the pigs. Two strips beveled and fastened in the bottom of the tank engage lugs on the edges of the cans to keep them from floating at the top when partly full of milk, and prove a great convenience. The cans are the ordinary creamery style. This dairy can be run in the winter by keeping it slightly warm by means of an oil stove or otherwise, but we find it easier to set the cans in the pantry on a shelf, and it does very well. Extreme care of the milk should commence as soon as it is obtained, and continue through all the stages of its handling.

EDUCATION FOR THE FARMER.

E. C. McKEE, LAINGSBURG, AT CLINTON COUNTY INSTITUTE.

A very important element, and perhaps the most powerful of all toward the education of our youth, is the power of home influence. Samuel Smiles has said, "Home is the first and most important school of character; it is there that every human being receives its best moral training or its worst, for it is there that he imbibes those principles of conduct which endure through manhood and close only with life." It is mainly in the home that the heart is opened, the habits are formed, the intellect is awakened and the character is moulded for good or for evil. The good home is the first and best educator in the world, not only in youth, but in age. It is there that the young and the old learn lessons of cheerfulness, patience, self-control, and the spirit of service and duty. Much depends upon the home, for it is the very corner stone of society and good government. Then how important it is that we spare no pains in surrounding our homes with all the influences possible, to make them pleasant and attractive, to enlighten and uplift, that they may be true educators not only to instill the principles and attractions of farm life, but in the development of pure manhood.

SOME OF THE NEEDS OF OUR DISTRICT SCHOOLS.

FLORA J. BEADLE, COUNTY COMMISSIONER OF SCHOOLS, AT BARRY COUNTY INSTITUTE.

There is one more thought which I would suggest to you and then I am through, and that is this: The mother in our district and village schools might be much more helpful than many of them are at the present time. Throughout this land of ours the mothers are coming to accomplish much for the school as well as for questions of vital interest to the public. Let me tell you that today there is no more powerful lever for good in any community than a mothers' meeting rightly directed. It is the mothers' meeting that has brought about this great change of sentiment in regard to child nature and child study. It is the mothers' meetings that have brought the people all over this great land of ours to a realization of the fact that insight, instead of blind instinct, is needed to train our boys to right manhood, our girls to right womanhood, and both to good citizenship. The mother, more than at any other period in her history, stands side by side with the father and the friend and the brother, his peer in power to acquire, and if her acquirements be of the right sort, his peer in power to execute. So, mothers and fathers, may you go forth from this Institute realizing that there are many responsibilities in regard to the welfare of your district school resting upon you.

THE CARE OF FARM IMPLEMENTS.

H. COBB, EDWARDSBURG, AT CASS COUNTY INSTITUTE.

Who can say how much is taken from the value of a farm wagon in a single season through exposure to the hot sun and rain which come upon it if left unsheltered? Yet it is noticeable how soon such a wagon becomes useless, paint gone, iron work rust eaten, and every part ruined. The man of means may invest in the most fertile farm in the land; he may equip it with the most improved implements, and procure the best seeds and plants to be found, but if he pays no attention to the less important details of the farm, his investment will not pay, in a financial way at least. On such a farm the tools are certain to lie in the field exposed to the weather, uncared for. And how comparatively easy it is to stop this waste. There is no farmer so poor but he can have some kind of shelter for his farm implements. It surely is not economy to leave these unprotected for any length of time, since they become useless by so doing, and it becomes necessary to procure new ones when the old ones should still be in use. After the shelter is provided, care should be taken to thoroughly clean and oil the bright parts of each tool as it is put in its place. Not unfrequently it costs the farmer ten times as much time as it should to get his plow to work properly the first day he starts it, all because he neglected to oil the mold board when he laid it by, and before the close of the day he is not satisfied with the quality and quantity of the work done. When the binder is stored away, the sickle should be oiled and placed as far from moisture as possible. The edge of the sickle is very delicate, and it may be injured more by rust in one season of idleness than in two seasons in actual use.

HOW TO MAKE A GREEN PEA THAT IS FIT FOR THE GODS.

APP. M. SMITH, LUDINGTON, AT MASON COUNTY INSTITUTE.

As to how you should plant them, you make furrows fifteen inches apart, three inches deep, with a sharp pointed hoe or the corner of a common hoe, along a stretched line. Scatter the peas to it from the hand so there will be from three to five seeds in the space of an inch. This will take a pound or more of seed to 100 feet of row. We then cover with a hoe or rake, making the top of the ground as level as possible, and throwing out all sticks and stones and rubbish as we go along. On perfectly level and clean soil the planting may be done with a seed drill. The furrow must be made equally deep all along the row, and must be covered so that when finished there is the same depth from the surface down to the seed all along the row. You must not leave the seed four inches deep in one place, three inches in another, and two in another. You may think it makes no difference, but it does. The peas only two inches deep will come up first, will blossom and mature peas first, and if at any time before maturity you have a drouth, they will dry up and bear less than those planted deeper. At the time when the main crop is just ripe to pick, those shallow planted will be past their prime, and getting mixed in with the good ones will spoil the whole, and our peas when brought on the table will not be fit for the gods or even we poor men to eat. Again, when planting, if your furrow is marked with ups and downs, the peas you drop will run down into thick clumps and come up that way. Inside the clumps of vines the peas will mature slowly, and then you will have a mixture of ripe and unripe peas, and those taken from the inside of the clump will not be as good in quality as those picked from the outside. Evenness of planting, both as to the depth and quantity of seed, must be observed or you cannot have fine green peas.

PRODUCING MILK FOR THE RETAIL TRADE.

P. H. DAVIS, ST. JOHNS, AT CLINTON COUNTY INSTITUTE.

To maintain the flow of milk during the summer drouths it will be necessary to supplement the pasturage with other green feed such as rye, oats, and peas, and corn sown and planted at intervals, so as to form a succession from July until the cows are stabled in the fall. Care, however, must be taken that the change from dry feed to green rye is not too abrupt or there may be a perceptible flavor caused by the rye; but if the change be made gradually it will be found an excellent producer. Having given the cow the food that will give good wholesome milk, see to the stable that it is so warm that it will never reach the freezing point when the thermometer reaches zero outside, well ventilated that the offensive odors may readily pass away and not contaminate the milk when drawn from the cow. Let the cow spend the nights in the stable from the first of these cold raw nights in the fall, often as early as the latter part of September, until the warm, balmy nights of late spring, and the entire day, with the exception of an hour or thereabouts during the most severe weather of winter.

There is another difference between taking care of milk for the retail trade and the factory or creamery. Not but what it should have just as good care in one place as in the other, but the retail milk man has a personal reputation to make and maintain on good milk that will keep sweet the longest possible time. To secure this, every step from the cow to the customer must be along the pathway of cleanliness. The cows' udders must be cleaned by the use of a dry cloth or brush. As soon as the milk is drawn from the cow it must be strained, not only through a wire sieve strainer, but through cloth strainers, and then cooled and aerated as fast as possible by stirring, dipping and pouring, being sure that it is first cool before closing the cans tightly.

GOLDEN OPPORTUNITIES.

MRS. A. F. DOYLE, BAD AXE, AT HURON COUNTY INSTITUTE.

Are our boys and girls of the present century heedlessly floating with the stream of time without one thought of what grand achievements may lie in their power? Can we not say some word that will inspire them to grasp every opportunity for the higher and nobler education, that they may do all in their power to help the world in its upward progress, that they may be able to cope with the disappointments and adversities which in the very nature of things they must meet and can only overcome by right living and right doing? Let us be awake, be earnest as a great army ready to face the storm of battle at the command of its officer, so we, as soldiers in life's battle, must go forth with energy so firm, zeal so great, that we may be able to plant the standard of truth and right upon a sure foundation, and be brave and manly enough to bring to any honorable calling dignity and the fruits of education and culture, strong and courageous enough to bear the burdens and responsibilities more loyally for the discipline thus received.

WELCOME ADDRESS.

JOS. GLASSON, SR., GAYLORD, AT OTSEGO COUNTY INSTITUTE.

We believe that ours is a good country to live in. I do not mean to say that we can grow pineapples or bananas with success. Neither would I recommend the planting of an orange orchard, but we believe that with the judicious selection of fruits, vegetables, and cereals that are adapted to our land, and with industry and a measure of common sense rightly applied, this is not a bad country to live in. It is true that for three or four years we have suffered severely from drouth, but not more, if as much, as in some of the southern portions of the State. Our clover has failed to catch during these drouths, but not more so than in the counties below, and if we have suffered from the ravages of the grasshopper, it has not been worse with us than in some parts of the State that are supposed to possess superior advantages. It is true that the snow continues on the ground until the spring is somewhat advanced, but owing to the genial influence of the lakes we have but little cold in the fall, and when visited by a cold spell you will usually find that it strikes them much more severely further south. It was generally supposed ten years ago that we could not grow corn. It was admitted that we had the right kind of soil, but the seasons were too short, but we have demonstrated after several years' experience that corn can be grown with success and profit. In 1894, while our friends below were utterly bewailing the failure of their corn crop, it was our pleasure to husk, in many instances, 100 bushels per acre of good corn. Our potatoes, for abundance and quality, are known far and wide, and yield from 200 to 300 bushels per acre.

OUR DISTRICT SCHOOLS.

PERRY OSTRANDER, GRAYLING, AT CRAWFORD COUNTY INSTITUTE.

It seems to me that some who write about our district schools have very little idea of the actual situation of the public schools in some of the newer parts of the State. We are taxed unreasonably high and are yet unable to secure good schools. Some of the laws recently passed by the legislature, while no doubt desirable for the older settled portions of the State, only increase the difficulties under which we labor. I have taken pains to inquire into the condition of some of the districts in this county.

Let us commence with District No. 2 of Grayling township. Last year this district voted to raise one hundred and fifty dollars, to be assessed on the taxable property of the district. The treasurer succeeded in collecting a trifle over thirty dollars. That, with a balance left over from the previous year, gave them a two months' school. They now have seven dollars on hand with the prospect of getting about thirty dollars more. (They will lose their share of the primary money.) Their house needs painting and their platform and steps are rotten and unsafe. Out of the five sections comprising this district, only three-fourths of one section pays taxes. How about their five months' school, their flag, their toilet set, etc?

The next district east in Grove township voted to raise one hundred dollars for expenses and succeeded in collecting fifteen dollars. Passing south we come to the Waldron district in South Branch township. Here they contracted to have a five months' school which they obtained by cutting wages and the price of board. District No. 1 of Center Plains township has thirty-five dollars on hand. They voted to raise one hundred and fifty dollars, but their director says he dare not contract for over three months' school as they do not expect to collect over fifty dollars. District No. 5, fractional, of Grayling and Center Plains, has about twenty-five dollars on hand. There being only one pupil to attend during the fall term, he was, with the approval of the Superintendent of Public Instruction, sent to the Grayling school at the expense of the district. The district voted to raise one hundred and fifty dollars and will collect about fifty dollars. It has on hand about one hundred and fifty dollars' worth of superfluous furniture.

District No. 5 of Grayling will possibly have their five months' school. It has three pupils and a house that would accommodate at least fifty. Their director says they had six hundred dollars' worth of furniture and fixings, mostly superfluous. One district in Ball township will have no school. They have given up trying. Some of our districts have fewer scholars than they had ten years ago, and unless more settlers come in soon more of those now here will move away in order to educate their children.

RELATION OF THE UNIVERSITY TO THE FARMER.

PRESIDENT ANGELL, ANN ARBOR, AT WASHTENAW COUNTY INSTITUTE.

The great object of the University is to do the best work possible for the whole State; to educate men for all pursuits of life; to furnish the State as a whole with broad minded, noble men, men with the best equipment the world can give, to do their work for all, and to be a benefit to all. An erroneus idea prevails that the graduates are equipped at public expense for private gain and return nothing to the State for the money expended upon them. A man cannot appropriate an education to himself. It inevitably becomes a public benefit. Take the average physician. Is his medical education of greater service to himself or to the community in which he lives? He is much more a blessing to the world than to himself. It is in this broad view that the people should look at education. It is sometimes said that each man should pay for his own education all it costs. Now, if this principle were carried out it would not affect the rich, they would be educated in any case. But where would the poor man's son be? If the day should ever come when poor boys and girls cannot come and get the very best education Michigan has to offer, that day my services shall be ended. If ever there shall be two distinct classes, the rich and educated, and the poor and ignorant, then God have mercy on Michigan. Michigan is glorious throughout the world because she has never set any barrier to the highest and best education she has to offer, and she will never be untrue to such a policy. This is the Michigan idea, any other is foreign.

MARKETING FRUIT.

T. C. WALKER, WESLEY, AT THE MASON COUNTY INSTITUTE.

Choose such fruits only as will grow to perfection in this section of the country. Train your trees so that the heads will be open and the fruit will color evenly as it ripens. Thin all fruit trees so far that the fruit will have plenty of room and the trees will not be overloaded. Proper thinning insures even size and at the same time gives as many bushels, if not more; moreover, it saves time at picking when we most need it. The fruit should be just the right color when picked. It requires experience to know just when to pick peaches. It depends among other things how far the peaches are to be shipped. Better to go over the same tree three or four times and take each time only those peaches that are ready to ship than attempt to pick all the peaches on the tree at one operation. Use only new, clean and tasty packages. The neater the package the better it sells. The package must be an honest one as to size. If it purports to be a fifth bushel it should contain a fifth bushel and not a less amount. There are all together too many different sized packages in use. When you put up a package of fruit put your name and address on it and guarantee that the fruit is all alike and all up to standard. Do not scrape up the culls and put them in the bottom and trim the top with nice looking fruit as it not only hurts you but it makes the consumer suspicious of all fruit coming from your neighborhood.

GOOD ROADS.

WM. L. WEBBER, SAGINAW, AT SAGINAW COUNTY INSTITUTE.

It is to be hoped the experience of those counties which have adopted the county road law will be such that its adoption may become general throughout the State. It is not supposed that the law is perfect in its present form; experience may show where improvements can be made. But, as every intelligent person concedes, it is idle to hope for good roads under the old township system. Authority should exist somewhere, so that a system of main thoroughfares for the county may be provided for, and may be improved uniformly and kept in good repair. Intelligent direction and supervision being essential not only in the construction, but also in the maintenance of good roads, for economy and best quality, the management and control of these roads and their supervision should be uniform. In a county like Saginaw it is especially important, where there are so many bridges to be built and maintained, and if the cost of constructing these thoroughfares and these bridges and maintaining the same could be placed upon the county at large it would greatly relieve the townships and give them more opportunity to improve the local roads leading to the thoroughfares. These thoroughfares, well constructed and maintained, would be a continual object lesson to the townships, so that the roads most used in their own immediate locality would be improved in a permanent manner.

It is also to be hoped that agitation will not cease until we shall have a further amendment to the constitution which will permit of the passage and enforcement of laws, by which the expense of making roads may be, in part at least, paid out of the State treasury.

MIXED FARMING IN WEXFORD COUNTY.

BARTON COLVIN, AT WEXFORD COUNTY INSTITUTE.

You may wish to know what the result has been with me in mixed farming, the amount of my sales and other details. In answer I will say that we bought our present farm 12 years ago, with 65 acres under cultivation, and have made improvements each year until we have 150 acres under the plow at present. The average number of acres worked is about 100 per year, and the average sales from the farm aside from timber sold have been over $1,200 per year, or $12 per acre, or a total of $14,400. I believe that many of the failures in farming are caused by the farmers not keeping posted in the amount of crops raised, the prices in different sections and the demands of the people. They don't read enough, but work too hard without stopping to think why they don't succeed. Lawyers could not practice law without books, or merchants do business without price lists, and it is so with the farmer. He must keep himself posted up to date if he makes a success of his business. We should all be closely connected with our Agricultural College and avail ourselves of the many things they find of benefit to the farmers by experimenting there. I don't believe that farming of any kind can be made profitable when carried on in a loose, slip-shod manner and in a spirit of indifference. The farmer must believe in himself and be interested in his work. Some have larger and some smaller farms than ours. Locations and conditions differ, but whatever be the size of the farm, wherever the locality or whatever the conditions, mixed farming is far safer and more profitable than specialties.

ADDRESS OF WELCOME.

L. E. SLUSSAR, MANCELONA, AT ANTRIM COUNTY INSTITUTE.

I know of no more honorable calling than that of farmer. There are times, perhaps, when you have envied the merchant, or the lawyer, or the banker and wished yourself in a position to take life as easy as they. But did it ever occur to you that the merchant, and the lawyer, and the banker have all envied the life of the farmer and that throughout the country today will be found thousands of business and professional men spending their vacations and their holidays upon farms of their own? And there are thousands of others who would do so did they but possess the farm. It is true that the comic papers crack jokes at the expense of the tiller of the soil and take delight in picturing Uncle Silas or Uncle Reuben with an old fashioned carpet bag in one hand and a dilapidated umbrella and lunch box in the other, falling an easy victim to the wiles of the bunco-steerer on his first visit to the city. They take delight in ridiculing the farmer and belittling his calling, but the fact remains that there is no line of business today which requires as much brains to make it a success as the one you have chosen.

STRAWBERRY CULTURE.

E. A. STARR, PONTIAC, AT OAKLAND COUNTY INSTITUTE.

For the last few years I have set from one and one-half to three acres each year, only taking one crop off and then plowing them under and planting some late crop. Last year the plow followed the picker and the next day I planted beans. The season being very late when they got ripe this year I plowed under one and one-half acres and set it out to cabbage. Had over 12 tons of cabbage. In following that plan I get no crop from the ground the first year but two the second. I see most nursery men advocate setting plants as early as possible in the spring. I do not like to set so early, in fact I think they do much better to let them wait until the ground gets warm and the fine white roots get started. We often pick off the buds as we are setting them out; I use Kellogg's perfection plant setter, one man making the cones and two following with the plants. While we cannot get over as much ground as some claim to be able to, yet they are set to grow when we do set them. We mark the ground three and one-half feet each way and then set them 21 inches apart in the row, use a planet Junior cultivator, twelve tooth with rake attachment, cultivating about every four or five days for the first few weeks; and right here let me say a word about the Breed weeder that we hear so much about for strawberries, onions, etc. If you value your patch you had better keep it out of it. I used it on one and one-half acres last year and while I carried it almost, yet those steel fingers are so sharp and so thick that they would root out from one to a dozen every time I went across the field, and not only that, I found that it had loosened a great many so that they might as well have been pulled out. In fact, the patch never got over it.

THE EDUCATION OF FARMERS' BOYS.

ADELAIDE D. SHICK, ROSE CITY, AT OGEMAW COUNTY INSTITUTE.

Brethren, the world does move, and the farmer who reads the most and practices what he reads moves on with it and invests his time to the best advantage and receives the best interest. The state provides for the higher education in the science of farming when it establishes its Agricultural College, its experimental station, its annual crop reports, its farmers' institutes, all the expense of which is borne by the lawyer, the doctor, the teacher, the editor, the banker, just as much as by you. And yet we hear farmers grumble and say that all the other classes have the advantage over them. Yea, verily, it is so—they do, brother farmer, and it is your own fault. The lawyer educates his children just as yours have the opportunity to be educated, only he insists on their building the foundation solidly. You send your boy to school on Monday; Tuesday, he stays home to saw wood; Wednesday morning he has a headache, but he goes in the afternoon; Thursday and Friday he helps you plant potatoes. In the winter months he does a little better and goes two and a half days in a week for five months in a year; and when he is fifteen, he stops entirely. When he and the lawyer's son are old enough to go to the legislature, which one is the best fitted for the place? The lawyer's son, of course. And he knows nothing of farms, or how laws operate on them; so the laws he aids in making benefit his own class of people. And if by dint of unusual intelligence the farmer's son is elected, he knows no more than to make laws right and just and good, but unconstitutional, and however good and right and just they may be, he doesn't know how to make them reliable. And then the generality of farmers say they are oppressed.

WHAT SHALL THE GOVERNMENT DO FOR AGRICULTURE?

R. M. BATES, HASTINGS, AT BARRY COUNTY INSTITUTE.

If it costs $1.86 to deliver a ton of grain to market, it costs at least one-half that to go to town for the mail. Every farmer goes to town at least once a week for the mail—at any rate that is what he says he goes for; 94c. per week, or $48.36 per year is what the farmer pays for rural mail delivery once per week. With seven miles to town, and over 137 farms in square form along the highway, there would be a farm house every 74 rods. With good roads and the rural postman mounted on his wheel, he can give us daily mail service for 93c per week. If he can it does away with the only objection to rural mail service, that of cost. More than this, it is said a bicyclist can cover 40 miles a day with ease on good roads. Presumably the delivery can be made for one-tenth this sum. Even if the government did not meet expenses on this branch of its service it is still worthy. From a financial standpoint, the army, navy and even in the farmer's own domain, the Department of Agriculture does not pay. So far as I know it brings no direct returns for its enormous expenditures.

With such postal facilities as are here suggested the service of the Weather Bureau could be easily extended without additional cost so as to be of great practical value to the mass of farmers. As some of you are aware the weather bureau has one or more stations in each of the states. From these stations weather bulletins are sent out each day giving forecasts of the weather for the following thirty-six hours. At the Lansing station predictions are made each day at 8 a. m. and the bulletins reach Hastings the same evening, thus giving predictions for twenty-four hours from the time the bulletin reaches the subscriber. Thus forecasts are of considerable value now.

With good roads and rural delivery and intelligent attention to mail transportation such as newspapers give, these bulletins can be of great value in haying and harvest time, and when frosts are predicted in late spring and early fall. In fact, the regular bulletins need not go at all. The daily paper which will then be as much a necessity to the farmer as it is now to the business man, will give the necessary information. Electricity as a motive power on highways may be left for the present.

CULTURE OF PEPPERMINT.

HIRAM HUNTER, MOORLAND, AT MUSKEGON COUNTY INSTITUTE.

Peppermint is grown in all parts of the world where the climate is not too cold or too dry. It requires a deep black muck loam for raising the best grades of peppermint. This soil must be plowed in the fall, so as to save time in the spring and allow the winter frosts to penetrate the soil, so it will heave up and become mellow. As soon as the frost is out enough so the ground can be stirred go on with the disk harrow or pulverizer and work the ground until thoroughly pulverized; then go over with a smoothing harrow, which leaves the ground in good shape for planting. The farmer is now ready to draw the roots, which must be taken from the first year's growth of mint. After plowing out shake the dirt from them and put them in small piles; then cover with a coat of dirt to keep from spoiling. The ground must be marked with a shovel plow in drills thirty-two inches apart and from four to six inches deep. Then load the roots onto a wagon and haul them to the field that has been prepared; drop them into the drills overlapping so that the plants will come up in solid rows. The earlier the roots can be planted the better it is for the crop, as it gets the benefit of the early spring rains and a longer time for rooting.

As soon as the plant shows through the ground, so you can see the rows, start the cultivator. Go over once a week, and if any weeds show in the rows commence hand weeding and hoeing. It will be necessary to hoe and hand weed from three to five times during the season to keep the ground stirred. Keep the cultivator going until the runners start. Then let the crop stand until just before harvesting; then go over the ground and pick out all the weeds so as to secure prime oil. Harvesting begins about the last of August or first of September, when the plant is in full bloom and shows a dark, copper colored leaf with an oily appearance. When it is ready to harvest, select a hot, dry day; the hotter the day the better for a good yield of oil. The first year's crop must be mowed with a scythe and raked by hand; the second year's crop may be harvested with a mowing machine and raked with a horse rake. I am not in favor of letting a crop stand the third year, as the yield is small and the grade of oil inferior. To plow and replant pays the best rent for land, and does away with weeds. The oil is obtained from the leaves of the plant, so whatever tends to improve the growth of the plant makes more oil when harvested. After mowing leave on the ground until the leaves are well wilted.

THE NEEDS OF OUR DISTRICT SCHOOLS.

COM'R FOXWORTHY, AT WEXFORD COUNTY INSTITUTE.

Our district schools need, in the training of the young entrusted to them, that the knowledge acquired be practical, and capable of application. It is now an acknowledged principle that knowledge is not power unless applied. Unless the possessor of knowledge can apply it in some useful way in life, all his learning, cramming and memorizing of text books will be time wasted. A boy that had completed the second book of a so called arithmetic was asked to find the worth of thirty-seven pounds of pork at seven dollars and fifty cents per hundred. After puzzling his head awhile, he asked what page it was on. He was told it was not in any book. "Then," he replied, "there is no use fooling with it if it is not in a book." There is no need to spend time learning the location of some little unimportant hard named town or some harder named mountain in some still harder named country that no one ever heard of but the man that made the book, when the child could not give an intelligible answer, when asked for direction to a neighboring town in his own county, or who could not locate his father's farm.

FRUIT CULTURE FOR PROFIT.

A. ADAMS, SHELBY, AT OCEANA COUNTY INSTITUTE.

As to profits in the business I will give an illustration from personal experience. I picked from ten year old peach trees last season an average of five bushels to the tree at an average price of 65 cents per bushel, making the total net price per tree $3.25. Allowing 108 trees per acre gives a net profit of $351 per acre—a very good profit. This is only a part of the story. These same trees have not yielded a crop of fruit before in three years. My opinion is that any man who is industrious and has means enough to secure five or ten acres of land in good location, not far from a shipping point, can make a comfortable living and lay by something for future needs, and where can a man who wishes to engage in the business under such circumstances do better than in Oceana county? With heavy growers the chances for large profits are greatly lessened, for it requires a large outlay of money to care for forty, eighty, or one hundred acres of any kind of fruit; the grubbing, pruning, cultivating, spraying, thinning and picking, none of which can be neglected without loss to the orchardist. I have seen enough fruit go to waste in some orchards to pay all the expenses of picking and putting up the fruit, and among not very large growers either. But the man who adheres strictly to the business in all its details, and raises only choice fruit, will receive good reward for money and labor expended.

THE FARM THE BEST PLACE TO STAY.

C. A. CUTLER, NOTTAWA, AT ST. JOSEPH COUNTY INSTITUTE.

The farm may not turn the money some other business will; there isn't the chance to make money rapidly, neither is there the reverse chance of disastrous failure. A man doesn't usually get rich tilling the soil; but there are some things in the world besides money. Some things money will not buy—contentment and happiness. It may aid in securing them and it may drive them away. We have all heard the story of the millionaire who, when asked what he really got out of his vast fortune, replied. "My board and clothes." He might perhaps have added power. The possession of happiness does not necessarily follow. It is apt to be found in the humblest home.

We think the farm is a pleasant place. It may and does have its dark side; it has its bright side, too, its free, healthful, independent out-of-door life, with no overseer or boss to watch and drive. The farmer is his own master. With no vision of a lost place for tomorrow to mar the pleasure of today, he goes quietly on his way, as free from care and worry perhaps as a man can be. He faces today, it is true, hard times, poor crops and low prices. Friend Sharp has called upon us to come each with his remedy for the hard times. Hard work, economy, careful planning, close attention to business, are remedies that may properly be suggested at a Farmers' Institute, where planning and the study of agriculture are the order of the day. Much has been done to render farm life pleasanter, brighter, more profitable and more honored. You may reach the outside world by railroad, telegraph, telephone or mail with marvelous quickness. The roads are improved, the schools are better, and it would be hard to find a country where life and property are any safer than they are here. In conclusion, we think that a quiet, even, secure life, is to the average mortal desirable. Agriculture, the greatest single industry of the world, offers that. It is a good calling, an honorable calling, and it merits the consideration of any young man who is choosing his life work.

BOYS ON THE FARM.

F. C. SMITH, GLADWIN, AT GLADWIN COUNTY INSTITUTE.

Some eight years' experience in the care and handling of boys warrants me in saying that they are not naturally lazy, but are capable of doing, and will do, a large amount of profitable work if properly interested and directed. Here's the key to the whole matter: keep the boy's hand and mind both fully occupied. Keep a boy hoeing corn steadily alone all day and he will have discussed the subject with himself until it is worn threadbare, and he will be very reluctant to attack the same field again, but go with him, get him interested, and perhaps close a deal whereby he is to have a small share in the crop and he will work with you cheerfully. Such agreements when so made should be religiously carried out. The promise of a dollar, a holiday or a share in some crop should never be repudiated. I have seen men whose paper was held at 100 cents on the dollar that would rob and cheat their own boys in a way that constituted a high-handed outrage. The Sultan of Turkey could be no more cruelly despotic than some farmers are with their own sons and daughters in this respect.

It is absolutely wrong to let a boy grow up and go to school year after year with no work or responsibility, whatever, and it is equally wrong to make one plod through stupid hard labor 365 days in the year. The tendency in the first instance is to make him dislike manual labor and farming as an occupation, in the other to make him a dull, stupid machine capable of grinding out a certain amount of rude labor, and as he grows older you might find him working out on farms and in lumber camps until the end of his days. These courses are not economical. As soon as a boy is old enough he should have certain work given into his charge and he should be held responsible for it. As he grows older he should do a regular day's work when not in school, but it is not economy, after a boy has done a man's work all through haying time, to grudgingly give him twenty-five cents and expect him to celebrate our independence and be proud of his country.

FEEDING HOGS.

JAS. ANDERSON, MIDLAND, AT MIDLAND COUNTY INSTITUTE.

I would first call your attention to care and feeding of young pigs. I would try to take them away from their mother at about six weeks old. I would put them into a pen and feed them five times a day; morning and evening, new milk direct from the cow, and the balance of the day with skimmed milk; also a little whole corn, morning and evening, and nothing more until they are about two and one-half months old, then I would drop off to three times a day. Whole corn keeps them round and straight, and not poddy.

To fatten hogs the first thing they need is a house or pen, and hogs in a good healthy condition is the next thing, and my experience has taught me, if I wish to feed whole corn, to give them just what they can or will eat and no more, and that twice a day only. I have learned that to overfeed is very injurious to the animal and the waste of grain is more than useless. I have passed pens of swine where I have seen a large pile of corn mixed up with the filth of the pen and the hogs wallowing in their own filth. This is wrong. Neatness about the pen is just as essential to the health of the hog as it is to the family in the house, and the farmer who neglects these simple rules must be a great loser in the end. But our best feeders have come to the conclusion that ground feed is preferable, and I have tried it in two ways; first, to feed the meal dry, and my objection to that is that it takes longer for the grain to assimilate to the wants of the system than to make it into a stiff mush, which they can eat readily; this feeding should be attended to twice a day only; nothing should be given at noon, only a little water.

WHAT A COOPERATIVE CREAMERY CAN DO FOR A COMMUNITY.

I. J. BROUGAT, MIDDLEVILLE, AT BARRY COUNTY INSTITUTE.

It depends largely upon what a community will do for a creamery whether it proves a success or a failure. The doors of many creameries are locked today because the stockholders and patrons went into the business with no knowledge of it, in a weak, frightened, half-hearted way, ready to withdraw their influence and patronage at the first trifling grievance. Do you wonder they fail? Any business would fail depending upon the same class of patronage. In a community that will cooperate if you are determined to go into the dairy business on business principles, ready at all times to uphold and defend the creamery, there will be no trouble to build up a creamery that would be the pride of the town in which it is located, and a source of good profit both to the patrons and stockholders alike. To illustrate the above statement, I will give you figures of what our creamery at

Middleville has accomplished the past year. There have been delivered to our factory, 2,792,068 pounds of milk, from which were made 123,135 pounds of butter. Our patrons withdrew for home use 10,359 pounds of butter, which had a cash value of $2,115.80, the balance selling in the markets of the world for $22,105.12, making a total cash value of $24,220.92. Had this amount of butter been produced by the hard labor of the farmers' wives and daughters at home, and sold in the old fashioned way of taking it to the store and receiving store pay, it would have brought on an average about thirteen cents per pound. You will see in our little community on the amount of butter made we are richer by $8,213.37. You will say the farmers did not receive all this extra amount. Admitting this to be true, the farmer has received more in cash than he would had he made it at home, saying nothing of the hard labor saved.

THOROUGHBRED STOCK.

E. H. DOANE, AT ISABELLA COUNTY INSTITUTE.

I think one of the best ways for the farmer of today to succeed is to raise more on an acre of ground; put the land in a better state of fertility, and raise better stock, and I think one of the best fertilizers is plenty of stock. If we feed nearly all the fodder we raise, and a large part of the grain, and free our barnyards of manure about twice each year, we will not be apt to run out the land; then, if the well bred and well fed stock will bring a good price today and all the time, would we not be all right yet, even though it seems to be hard times, if we would be more thorough and stand right by the best stock we could get, discarding the scrub any and every time? I think they should fast become a thing of the past. If we could always use sires that are thoroughbreds, and then give that young stock we get from such breeding a fair chance, or in other words crowd it to maturity as fast as possible, I think we would be better pleased with the prices we receive for our surplus stock; but, on the other hand, if we breed to thoroughbred sires, and then sell our calves for veal, because they are nice, or the pigs at weaning time, or sell the young stock because it does not just suit us at first, and then go back to the scrub, we will never sell the high priced stock, unless we buy another man's experience and care. But wise breeding is not all that is necessary; the young stock needs care and feed from birth to maturity, and without these combined efforts success is impossible; but one will say I don't see but what my hogs or my calves, or my lambs, are about as good as yours, but when I ask them how they happen to have such good stock, I find they have been using thoroughbred and high grade sires for several years, and of course they can't get a grade without a thoroughbred; but I contend that the grade is not as good as the thoroughbred; of course, after several crosses, the grade may be nearly as good, but we always notice that every cross produces an easier keeper and comes one step nearer to the ideal breed of our choice.

ADDRESS OF WELCOME.

ALEX. SHARP, CENTREVILLE, AT ST. JOSEPH COUNTY INSTITUTE.

Throughout the past ages agriculture was considered to be a menial and degraded employment. The farmers had not taken the social position that belonged to them. Farming was to be raised to a higher position, and it was to be raised through the farmer himself; but progress was slow. In 1783 the British Board of Agriculture was organized. This brought together for the first time men from every part of the kingdom. There was a general exchange of opinions and questions of importance were thoroughly discussed. This was the beginning, and since then the need of applying the intellect to agriculture is universally acknowledged, and so we are met here today to discuss and discover the best possible methods of farming, and to find all the means in our power to make our vocation a success, and so we greet you because of the purposes for which you are here.

THE USE OF COMMERCIAL FERTILIZERS.

WM. H. MERRICK, AT BARRY COUNTY INSTITUTE.

After watching the matter closely I have come to the following conclusion as to the use of commercial fertilizers in corn. We all know that for the first two or three weeks after corn is planted it makes a slow growth unless the weather is extremely favorable. This is just the time when the fertilizer gets in its work. The little fine rootlets from the seed find the fertilizer, and the moisture and heat arising therefrom force the young plant to a vigorous growth just when it is needed. After corn gets waste high it sends out its large roots that feed on the decaying sod or any coarse manure that may have been applied. Then we all know it makes a vigorous growth and is able to take care of itself. But it is when the plant is young and tender that it needs nursing. After taking the corn off my field I plowed it in the fall, and the next spring fitted it and broadcasted the oats with 100 pounds of fertilizer to the acre. The oats made a good growth, the straw was of good length and stood up well, the heads were well filled and the oats threshed out forty-five bushels per arce. A field just across the lane, on equally as good soil, but without fertilizers, had twenty-five bushels. After taking the oats off I plowed the land and fitted it the best I could for wheat. I drilled in 150 pounds of fertilizer with one and a half bushels of wheat per acre. The wheat went into winter with good top and came out looking fairly well in the spring and yielded twenty-five bushels of nice, plump wheat per acre, while the other field without fertilizer went ten bushels. Perhaps I should not claim that the fertilizer made all the difference, as the first field was sown to Red Winter Fife and the other to Clawson, although Clawson has usually done well for me. I drilled timothy seed with the wheat on both fields; on the first field there is a good stand of timothy today, and on the other it is all burned out by the drouth. One application of fertilizer has a beneficial effect upon at least two succeeding crops.

THE NEW WOMAN.

MRS. JOHN COOK, MORRICE, AT SHIAWASSEE COUNTY INSTITUTE.

I have said once or twice we already have our rights. For the benefit of this new woman, I wish to repeat it most emphatically, we already have our rights. Do you ever travel? Not extensively, perhaps, but about our State, even to Detroit, Ann Arbor, Jackson, Lansing, or Flint? Do you ever notice when you board a railroad train how the men stand respectfully back till we are safely aboard, not only in railroad trains but in street cars, in lecture halls, in churches and upon the street? Everywhere we are first and foremost—even the law shields and defends us more carefully and closely than our fellowman. If a great ship is in danger upon the tempest-tossed ocean and the lifeboats are put out, are they not filled to the uttermost with women and children, while the husbands, brothers and sons go bravely to meet their death, if need be? If the dogs of war are let loose, and army is contending against army in civil or international strife, do we march shoulder with those who battle for their country? Is it exacted of us to share the hardships and privations of the camp or the dangers of the battlefield?

O, my friends, the world is made up mostly of noble men and women. The balance of joy and sorrow, if we only will, is held in the hand of justice. The height to be attained in the perfection of true womanhood is like unto a golden mountain. Its summit can only be reached by patient self-denial, by truthfulness, by devotion to those who love, honor and respect us. If we follow closely the only path of duty we shall come out at last to stand upon a pinnacle of this golden mountain, against whose summit no storm cloud ever sweeps, and be blessed with the peace ineffable. They only are the ones who are the best beloved of earth's children here.

OUR COUNTRY SCHOOLS.

SUPT. H. E. SHELDON, CORUNNA, AT SHIAWASSEE COUNTY INSTITUTE.

One of the most important things for a school is a good teacher. So important is it that a good school is impossible without a good teacher. You can have just as good school in a log school house as in one of brick. A good school is possible without blackboard or any modern appliances for teaching. Garfield's model school, you will remember, consisted of a log with the boy sitting on one end and the teacher, Mark Hopkins, on the other. If you can get the boy, Garfield, and the teacher, Mark Hopkins, together, you are sure to get results. The school is not a place of refuge for those who have failed in other callings. It is not for the sake of giving employment to those who are too proud to beg and too lazy to work with their hands. Sometimes we hear a contrast between the teacher, who works from nine to four, and the hired man on the farm, who works from sun to sun. The latter, it is said, works more hours and ought to receive more. This criticism I believe is just on any teacher who does not begin work until nine and who stops it at four. It is cheaper to pay such a teacher to keep out of the school, for a school will never be better than the teacher. It is better to close the schoolhouse than to have a poor teacher. If a district cannot afford what is necessary to secure a good teacher throughout the year, it is far better to have a good school as many months as possible and no school at all the rest of the year.

Once in a while we will find a district that will engage the best teacher it can get where there are many large scholars, but that thinks when the school is made up of young pupils, that anything will do for them. I believe this idea is being changed around. Those large pupils are able to get some good without any teacher at all. These young pupils are dependent upon their teachers. Above all others they need good instruction. If they do not have it, most of them will acquire a dislike for school and will consider it merely a place of confinement. At the very beginning, their chances for acquiring a good education will have been ruined. In these early days the child can learn easier than at any other time. If children attend school constantly from five to ten under good instruction, nine-tenths of them will secure enough education to enable them to make their way fairly well through life. If this early education be neglected, they must be securing the rudiments of education in those years when they ought to either have reached a higher plane in studies or to be doing useful work outside of school. And this early study, properly cared for, will not injure the child. Children learn easily what interests them. A child the first five years of his life learns what most of us would find hard to learn in five years of study at school. He learns to speak new language. And if he learns proportionately as much the next five years, he will find himself at the age of ten a very good young scholar.

THE POSSIBILITIES OF THE NEW WOMAN ON THE FARM.

MRS. E. D. NOKES, CHURCH, AT HILLSDALE COUNTY INSTITUTE.

In their isolated homes they read of the marshaling of their sisters under new business, and their listening ears catch the echo of the shouts of victory as they discover with their better opportunities, new worlds of thought and action, stirring their hearts with a longing for the necessary drill to advance and protect their own domain. The strength of this advice is manifested by the number of farmers' wives with the gray around their temples who are reaching out and grasping everything which will give them light and knowledge upon this new phase of existence. They feel and know that their life work has been retarded by lack of skill and educational privileges. They realize that all professions require specific training and facility in doing their work, and they are doing justice and judgment unto themselves by seeking the way and means for this training. Their individual work has been one of the greatest factors in the creation of the material wealth and prosperity of this great State.

THE NEEDS OF OUR DISTRICT SCHOOLS.

COM'R J. W. SMITH, BAY CITY, AT BAY COUNTY INSTITUTE.

What the district schools of nearly every township in this State need just now is to be reduced to a system. At present they are a little more than a disjointed collection of schools, some good, some bad, but whether good or bad, they have no chain of interdependence and nothing to look forward to for the next step in a higher course than the neighboring city school. In the same sense in which a city system of schools may be said to exist, there is no such thing as a system of district schools in Michigan. Some attempt has been made of late years towards reducing the district schools to a system by the introduction of a graded course of study extending through eight grades and bearing a close resemblance to the course of study found in the average city school. But beyond that nothing is even attempted. There ought to be, and under proper conditions there would be, enough pupils in every township containing four or five hundred children of school age to give employment to at least one teacher who should give all his time to the more advanced classes. For the accommodation of these pupils there should be erected in the center of the township, as nearly as may be, a school known as the township high school. The course of instruction should contain all those branches that are necessary to prepare the pupils to enter the State Agricultural College. The pupils who graduate from this township high school should be given diplomas entitling them to enter the Agricultural College without further examination.

PROSPECTS FOR THE YOUNG FARMER.

JAMES Y. CLARK, ORION, AT OAKLAND COUNTY INSTITUTE.

We predict that the future will evolve an organization through which the farmer will transact his own business through his own paid agent, when he will remain in full ownership of his produce until it passes into the hands of the wholesale consumer; an organization that will eliminate all needless intermediaries between the farmer and his customer, and return to him the whole income from his crop less actual carrying charges; an organization that will gradually become national in its character, because of being a financial benefit to every farmer that joins it—one that will increase in a ten-fold ratio the farmer's potency in legislation, and forever remove mere questions of business from the realm of partisan politics.

And when such an organization comes, as it must come, if the farmer is not to become a mere cipher in our body politic, then will the wall that has melted away and compelled us to compete with cheap lands and pauper labor, rise again. Then will the parasites who fatten on the misfortunes of the farmer be removed from the carrying trade of his produce; then will our financial system expand broad enough for the needs of the poor as well as the luxuries of the rich, and the agricultural interests of this country obtain consideration in a measure commensurate with their importance.

THE OLD LOG HOUSE.

MRS. KITTIE C. MCCOY, WALLED LAKE, AT OAKLAND COUNTY INSTITUTE.

It stands by the roadside, deserted and lonely,
  A quaint looking structure now crowned with decay;
The roughly hewn timbers are slipping asunder;
  Time-worn and discolored and crumbling away.

'Tis many a year since the door has been fastened,
  The threshhold is sunken, the floor is worn thin,
The windows are broken, the roof small protection,
  The snows of the winter drift drearily in.

The trees which surround it have long been neglected,
  Their o'erhanging branches grow whither they may;
Not even a pathway is traced in the dooryard,
  For seldom a visitant happens that way.

And thus the old house stands deserted and lonely,
  Claiming only decay from each swift passing year,
And yet 'tis the center of fond recollections,
  Of beautiful pictures to memory dear.

'Tis many a year since the slumbering echoes
  Awoke to the ring of the pioneer's blow,
Awoke to the crash of the trees, which in falling,
  So rudely affrighted the fleet-footed roe.

Long years have gone by since the gold of the harvest
  First gleamed where the tangle of wildwood had been;
Since the sods of the valley were cleft of the plowshare,
  And the hillsides were dotted by corn growing green.

'Tis long since the thicket gave place to the garden;
  Since the fruit trees took root in the life giving loam.
'Tis long since the farm was marked out in the woodland
  And given the endearing title of home.

Ah, strong was the arm of the pioneer farmer,
  And love was the motive which thrilled in his breast;
What wonder the dwelling, though rude in construction,
  Became a small haven of joy and rest.

And there by the gloom of the forest environed,
  Save the trail of the Indian no pathway in sight,
The dear little home shed an influence cheering,
  As the gleam of the star in the shadow of night.

And proud was the bride in her rough little cabin,
  As proud as the queen in her palace so fair,
For life stretched before her with all its ambitions,
  With love to inspire and to lighten her care.

Oh, wonderful magic which brightened the shadows,
  And lightened the burdens from day unto day,
While blessed contentment, a guest ever honored,
  Remained in the log house made welcome alway.

Time hurried along with its measure of changes;
  The farm grew in beauty and value each year.
Within the log house there was thrift, there was comfort,
  And the prattle of children was pleasant to hear.

The howl of the wolf and the scream of the panther
  No longer were heard from some far away hill.
The trail of the Indian became a broad highway
  Which led to the church, the store or the mill.

There were larger barns needed to store the rich harvests,
  And cellars for keeping the bounteous store,
And when there was builded a handsome new dwelling,
  The little log house held the home light no more.

Away from the shelter for many years given,
  The home circle moved to the house on the hill.
The tide of improvement swept steadily onward,
  But the little log house and its memories stood still.

Sometimes they would visit the old house together,
  The two who revered it as home long ago;
And they loved to remember and loved to talk over
  The scenes and events which they once used to know.

The shelf was still there which had held the worn Bible;
The three-cornered cupboard was still in its place;
There were hooks in the wall, where had hung the good rifle,
And the queer wooden clock with its oft studied face.

There were marks here and there which were made by the children,
And each brought its own little story to mind..
Thus came the remembrance of joys and of sorrows
That were strewn in life's pathway for each one to find.

In the evening of life there is much to remember,
Who would care to live over the long day again?
There is a tincture of grief in the sweetest of music,
The joys that are deepest hold measures of pain.

How strangely the sweet and the bitter are blended;
How close intermingled are laughter and tears,
As the sunbeams of morn meet the mists of the valley,
As the rainbow's bright arch on the dark cloud appears.

And oft in their dreams time for them would flow backward,
On refluent wave to the days long ago,
When the home in the woods held their hearts' dearest treasures,
And hope crowned their zeal with a radient glow.

They enjoyed the new house with its modern designing,
The bright pleasant rooms gave them comfort and cheer,
But the pioneer memories ever they cherished,
And still to their hearts were those memories dear.

The years drifted by and this father and mother
Drew nearer and nearer the shadowy shore.
At last came a day when their places were vacant,
And death's silent mystery shrouded them o'er.

But still by the roadside the old house is standing,
A quaint looking structure forsaken by all;
The roughly hewn timbers are slipping asunder,
The weather worn rafters seem ready to fall.

Farewell, dear old house, those who builded and loved you
Have yielded their hands to the clasp of decay,
Like those brave pioneers you have finished your mission,
And we give you a tribute of honor today.

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